News of the Industry Begins Page 944

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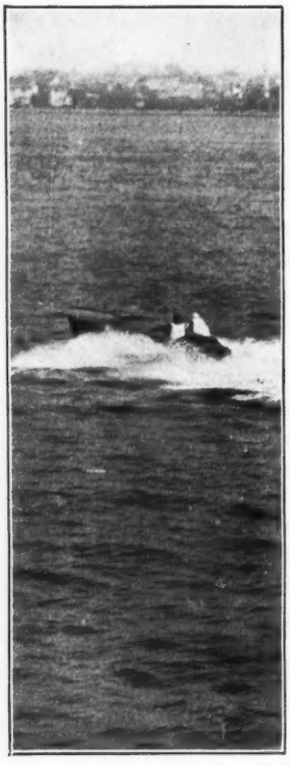

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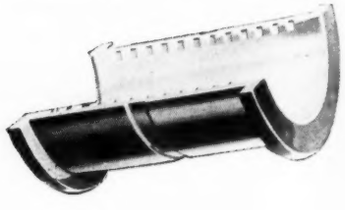


MANUFACTURERS OF HIGHEST QUALITY BEARINGS AND BEARING METAL FOR OVER 25 YEARS

AUTOMOTIVE INDUSTRIES

VOLUME 54 *Philadelphia, Thursday, June 3, 1926* NUMBER 22

91½ Cu. In. Cars Make Good Showing in First Test at Indianapolis

Speed during early part of race comparable with that of larger cars last year. Miller Special wins with average of 94.63 m.p.h. for 400 miles.

By Sam Shelton and Walter L. Carver

BY winning the Fourteenth International Sweepstakes race at Indianapolis, on Monday, May 31, Frank Lockhart, 23-year-old Los Angeles pilot, demonstrated, first, that a newcomer on the big brick oval has equal opportunity with the experienced drivers, and second, that the new 91½ cu. in. race cars have remarkable capacity for speed and performance.

Without being pushed except for a brisk spurt now and then, Lockhart, in a Miller Special, was a good two laps in the lead of his nearest competitor and had established an average speed of 94.63 m.p.h. when the race was called at 400 miles on account of an approaching rainstorm that broke with a downpour a few minutes later. Last year the winning speed was 101.13 m.p.h.

A shower at noon that had caused the race to be suspended for an hour and 10 minutes had wet the track pretty thoroughly before the drivers were called in and had served to slow down the rate of speed that might have been expected during the early part of the race.

Competition Keen

Owing to the interruption and the calling of the race at 400 miles instead of allowing it to go the full 500, the event lacked some of the intense thrills that have characterized these great speed classics in other years, but still the competition was keen enough and the rivalry intense enough to keep a record crowd in the stands and vantage points of the infield until the last.

Attendance was estimated by T. E. Myers, speedway manager, at about 140,000, which was said to have been the largest in the history of the track.

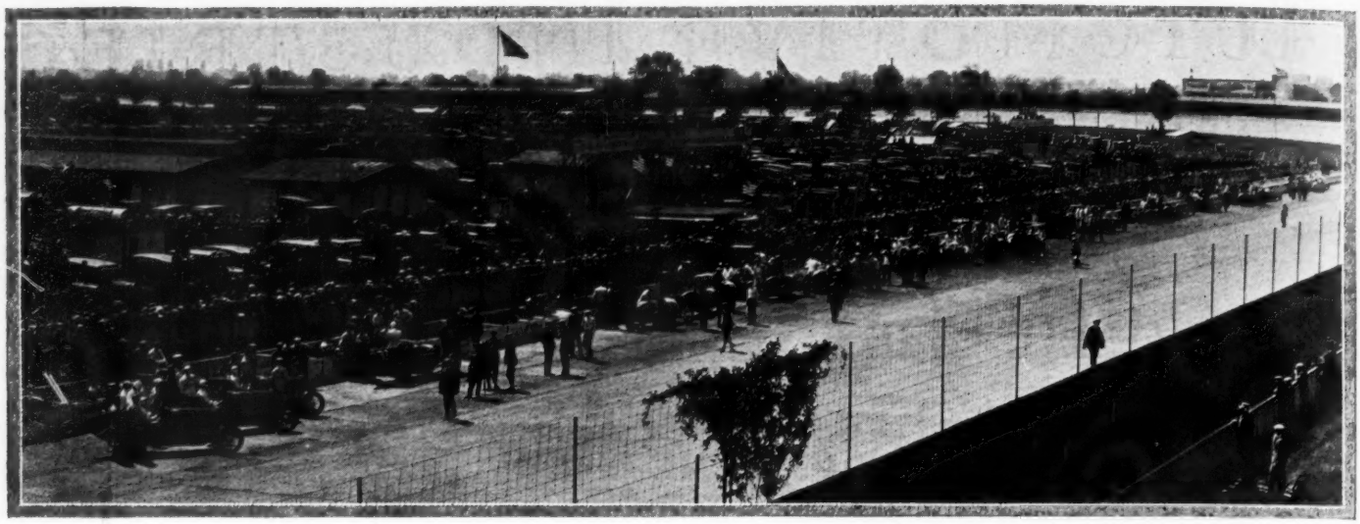
The speed set in the early part of the race compared favorably with that set at Indianapolis last year when the 122 cu. in. cars established new records. At the end of 25 miles this year the average of the leader was 103.06 m.p.h. as compared with 104.17 for the first 25 miles last year. At the end of 100 miles this year the leader's average was 100.39 m.p.h. as compared with 103.89 last year. At 200 miles, after the showers had interfered, the speed had come down to 97.76, while at the same point last year it was 103.79, or about six miles faster.

After the 200 mile mark the average was gradually reduced, reaching the low point of 94.56 m.p.h. at 375 miles, then gaining slightly as the drivers settled down to the grim business of finishing to the best advantage.

It was a Miller Special that Lockhart, heretofore unknown in the big speedway races but of considerable experience on the dirt tracks, drove to victory, and it was also a Miller Special that Harry Hartz wheeled into second place. Third place winner was Cliff Woodbury

Facts About 1926 Indianapolis Race

Distance	400 miles (reduced from 500 miles account of rain)
Time	Monday, May 31, 10 A. M.
Place	Indianapolis, Ind.
Sanction	American Automobile Asso.
Management	Indianapolis Motor Speedway Co.
Lap	2½ Miles
Number of laps	160
Track surface	Brick
Number of entries	39
Speed to qualify	85 m. p. h. for 4 laps
Number started	28
Number finished	13
Winning car	Miller Special
Driver	Frank Lockhart
Average speed	94.63 m.p.h.
Engine piston displacement	91½ cu. in.
Attendance	140,000
Winner's purse	$20,000 as first prize, $9600 in lap prizes



Cars lined up at the pits just before the start of the Indianapolis race

The "Watch Fob" Motor

This picture of a Miller cylinder block in the hands of a mechanic shows the pigmy-like characteristics of the modern racing engine. An engine of this type was used in the winning car

of Chicago, also a dirt track driver, whose mount, a Boyle Special, was of Miller construction but with engine equipped with Boyle valves.

How First Ten Finished

POSITION	DRIVER	CAR
1	Lockhart	Miller
2	Hartz	Miller
3	Woodbury	Boyle Special
4	Comer	Miller
5	De Paolo	Duesenberg
6	Elliot	Miller
7	Batten	Miller
8	Hepburn	Miller
9	Shafer	Miller
10	Duff	Elcar Special

Fourth place also went to a Miller Special, driven by Fred Comer.

The Duesenberg name, distinguished for successive and spectacular victories in 1924 and 1925, was kept in the front rank by Pete DePaolo, who finished fifth in a Duesenberg Special.

Only two Duesenbergs started, that driven by DePaolo and a two-cycle job driven by Ben Jones which went out of the race in its 53rd lap when it developed axle trouble and skidded into the wall. Three other Duesenbergs that had been entered were not ready to qualify.

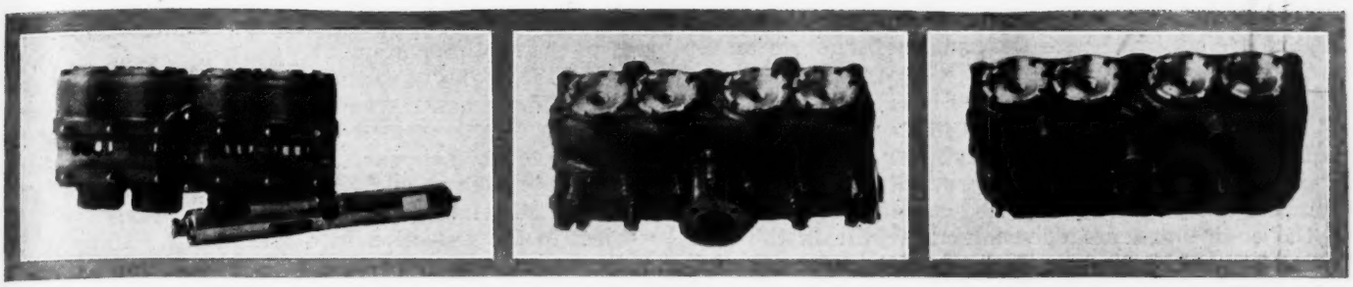
Although the race was rather sketchy, due to the interference of rain, several pertinent facts from the engineering angle were demonstrated. Because of the wet condition of the track the average speed fell below last year's record.

Early in the race the majority of stops at the pits was chargeable to fouled spark plugs. Apparently this difficulty arose from the idling period at the line prior to the paced lap. Practically all engines are fitted with aluminum alloy pistons of the full skirt type and the clearance between these and the cylinder walls averages around .006 to .007 in. It may be deducted that this very liberal clearance permits an undue collection of oil above the pistons before they reach working temperatures and dimensions.

In the latter portion of the race the predictions of several engineers concerning valve trouble were verified. Of the twenty-eight qualifying entrants, only thirteen were running when flagged in. Many of those who fell by the wayside after the first 150 miles recited the same complaint, valve trouble. Some trouble at camshaft bearings was shown.

Of the two-cycle jobs, but one Duesenberg appeared and showed an average speed of about 92 to 94 miles per hour until the first storm. Just as Seth Klein, the starter, flagged the cars from the track, the driver, Ben Jones, hit one of the north walls and wrecked his car, fortunately with no injury to himself. However, much remains to be done to improve the starting characteristics of this engine as the super-charger does not develop enough pressure at cranking speeds to provide a sufficient intake charge after the exhaust valve ports are closed.

Fred Duesenberg's suggestion of an electrically driven supercharger made at the January meeting of the Society of Automotive Engineers may be apropos of possible future developments. DePaolo's four-cycle job, the only other Duesenberg car in the race, performed very



Illustrations, left to right: Cylinder block of two-cycle Duesenberg with rotary distributor valve in foreground. Intake side of the engine with distributor valve in place. Exhaust side of two-cycle block

creditably after some minor adjustments in the early laps. This car qualified early Sunday morning and arrived at the track only a few minutes before the start and finished fifth.

Miller front-drive jobs failed to live up to advance expectations, although Lewis won forty-three laps before a valve pulled down. As these cars were capable of higher average speeds, engine speeds were increased accordingly and the valve trouble confirmed some advance skepticism. Cooper's front-wheel drive job passed out after 70 laps when he was in fourth position, due to transmission trouble. Connecting rod trouble finished the Hamlin rebuilt Ford front-drive car early in the race.

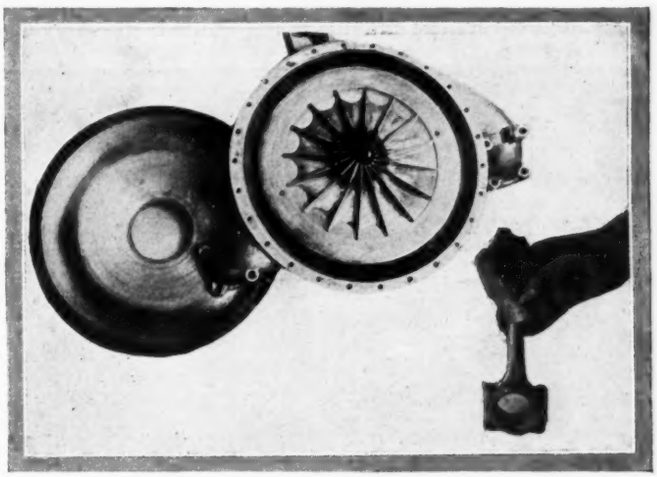
The foreign cars, Guyot and Schmidt Specials from France and the Eldridge Specials from England, were distinct disappointments, although lack of experience with present-day speed on this track seems to have been the chief trouble. With the Guyot and Schmidt cars, clutches and steering gears were the determining factor, although one final pit report showed engine trouble as the reason for quitting. One Eldridge went out due to a broken steering knuckle and the other developed a frozen camshaft. None of these cars compared with the Duesenberg and Millers for speed.

Lockhart and Hartz had Miller engines of the new type with bore of 2 3/16 in. and 3 in. stroke, as also did Comers, who finished fourth. Woodbury, who finished third in the Boyle Special, had a rebuilt Miller of last year's series having a bore of 2.344 in. and a stroke of 2 5/8 in.

All cars in the race carried Hartford shock absorbers all around and all had wire wheels. Firestone tires were used on all American cars but the Hamlin, while the European entries had Dunlops. New Departure bearings were used generally in American cars. Bosch magnetos were used on 21 of the cars which started and 12 of those which finished were so equipped. American engines carried Winfield carburetors, and European, the Cozette. Champion spark plugs were used in most cases.

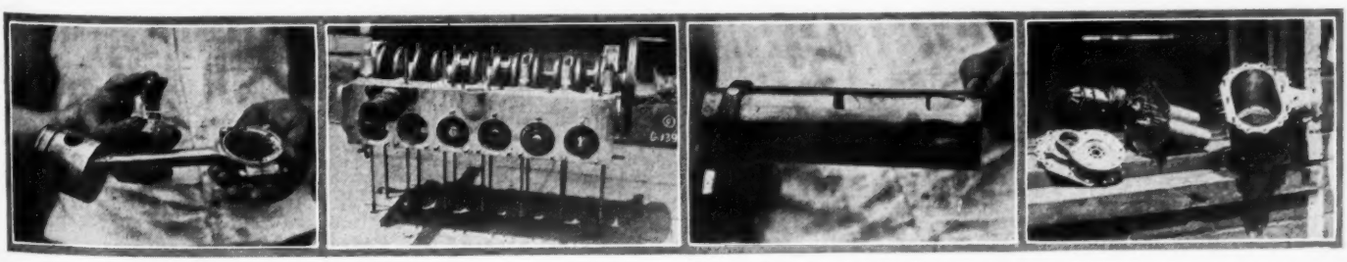
From the viewpoint of a railbird, the outstanding innovation from the engineering angle was the two-cycle eight-in-line Duesenberg engine used in the car which was wrecked when it skidded into a wall of the track.

The reason for the return of the two-cycle engine is obvious. Engines are a fourth smaller than those of the past three years and the reduction of 30.5 cu. in. has been made chiefly at the expense of the stroke, and rotating speeds are increased accordingly. Practically every job on the track was capable of at least 6000 r.p.m. at the engine. The necessity of higher rotating speeds combined with the hazard at the valve gear is directing thought toward alternative designs.



New Duesenberg supercharger with two outlet ports, cover shown removed. At the right is shown the piston and rod of the two-cycle Duesenberg engine

Superchargers are the rule and their use makes the utilization of two-cycle operation possible. Also this combination, particularly as worked out in the Duesenberg design, has the earmarks of feasible application to passenger car use. Slotted ports, which are characteristic of two-cycle design, are located at opposite sides of the cylinders. The exhaust port at the right side is placed just above the lower limit of piston head travel

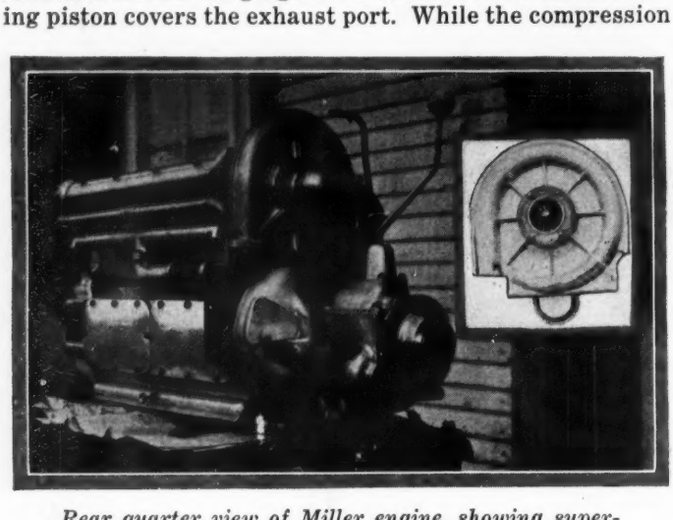


Above views show, left to right: Split roller bearing used in big ends of Schmidt and Guyot connecting rods. Upper half of Guyot and Schmidt crankcase. Sleeve valve which was original Schmidt equipment. Component parts of Roots blower used in Schmidt and Guyot cars

while the intake port on the left side is somewhat higher. Pistons are equipped with the usual deflector rib on top of the head.

This location of the valve ports is made possible by a rotary distributor valve which is in line with the intake ports at the left side of the cylinder block. As two blocks of four are used, two hardened steel distributor cylinders are joined by a splined coupling at the middle of the engine and are driven from a gear in the spur timing train at the front. Each of these rotary distributor valves is drilled out to form the gas passage to each of four intake ports. Midway of the distributor valve's length, three large cross holes are drilled to communicate with an enlarged annular chamber which in turn connects with one outlet from the supercharger. Although this unit is placed alongside the cylinders as in previous Duesenberg designs, the single outlet from the centrifugal blower and branch manifold have been supplanted by two supercharger outlets, each of which supplies four cylinders. This arrangement is common to both two and four-cylce Duesenberg engines.

Although the descending piston uncovers the intake ports before the exhaust is opened, longitudinal slots in the distributor valve are timed so that the cylinder is exhausted well before the supercharged intake stream enters. Some scavenging action occurs before the ascending piston covers the exhaust port. While the compression



Rear quarter view of Miller engine, showing supercharger application and intake valve side. Inset—Miller supercharger, rear view, showing deflector vanes at intake opening and drive pinion which engages with gear on crankshaft

ratio in the new four-cycle engines is 5 to 1, that of the two-cycle engine is 5½ to 1. As the crankshaft is of 2-4-2 arrangement, which eliminates unbalanced couples, two cylinders fire simultaneously as follows: 1 and 8, 4 and 5, 2 and 7, 3 and 6. Using the center main bearing as the axis, symmetrical cylinders fire simultaneously. It is thought that this action may have some influence in the direction of reducing crankshaft whip. Both types of engine have the same bore and stroke, 2.286 in. and 2.75 in. respectively.

Another unusual feature in the Duesenberg two-cycle engines is the spark plug mounting. A hole of approximately 1 in. diameter is tapped in the center of the plain cylinder head. Into this is screwed a conical shaped aluminum shell which also is flanged to close a larger opening in the water jacket. This aluminum shell is tapped for the spark plug concentrically with the threaded portion which screws into the cylinder head. With this arrangement, it was anticipated that spark plug trouble due to excess heating would be eliminated, as the thin aluminum shell of high conductivity and relatively large area would transfer the heat at its lower end to the cooling water.

From the angles of engineering and design, the chassis of 1926 offered nothing new. In fact, Miller and Duesenberg cars, which formed the bulk of the field, had the same chassis as last year. Drivers for both lines insisted that well-enough should be let alone. In a general way, the same stipulation applies to engines in the two lines subject to the reduction in displacement. Many of the Miller engines in this year's race had the same cylinder blocks as last year. The reduction in displacement has been made by a new crankshaft of shorter stroke characteristics. The same connecting rods are used but the pin location in the piston has been changed to maintain the correct compression ratio. Formerly the pin was placed close to the rings. In the modified engines the pin is located near the bottom of the skirt.

One of the relatively new features of this year's race was the use of drop center rims on the Eldridge, Guyot and Schmidt cars. All of these were fitted with Rudge wheels carrying Dunlop drop center or well-base rims. Tires were 30 x 4.75 in each case. However, no chances of throwing tires were taken by any of these cars. After the tire containing the tube was hooked over the rim, in the fashion made possible by the drop center construction, a rectangular rubber filler with beveled overlapping ends was worked into the well. This filler has practically the same cross section as the well so that for operating purposes, the tire is carried on what is substantially a flat base rim. At racing speeds, drivers of these cars state that no difference in steering or handling characteristics can be felt. However, some of the drivers were prone to criticize the rim and wheel construction as being too heavy.

Two Types of Superchargers

Superchargers offer some interesting sidelights this year. American engines were equipped with centrifugal blowers while every foreign engine carried a Roots blower. Duesenberg and Miller superchargers resembled closely the same units used on last year's cars and only minor detail changes to increase efficiency were made.

Schmidt and Guyot drove the Roots blower at 1.9 crankshaft speed while Eldridge uses a change gear which drives the blower at crankshaft speed for long races and at 1.3 speed for shorter dashes. In practically every American design involving the centrifugal blower, the impeller is driven at about 5 times crankshaft speed so that 30,000 r.p.m. can be exceeded. In every case the carburetor is located on the intake side of the supercharger and is subject only to atmospheric conditions.

Discussion with American and European desginers develops some ambiguities and uncertainty. The former state that the centrifugal blower is simpler, that it is free from any pulsation and leaves the intake passage open in case of damage to the supercharger drive. Also they are of the opinion that less power is required to drive the centrifgual type. On the other hand, the European designers point to the excessive speed of the centrifugal blower, stating that the inertia forces in such a drive must be dangerous elements and that more power is required than for the Roots type. However, it seems that this question of power requirement is a matter of opinion on both sides. Figures for power requirement at any speed were unavailable from either school. Further, European designers advance the positive blower characteristics of the Roots unit and associate this factor with higher pressures at the supercharger outlet.

Experimenters with the centrifugal blower can learn one valuable lesson from racing practice. That is, never attempt cast impellers. They have been tried around

some of the racing jobs with unsatisfactory and sometimes disastrous results. Duesenberg and Miller impellers are machined from a solid upset billet or duralumin and even then the deflector vanes near the center tend to straighten out. A cast impeller will increase ⅛ in. in diameter, if it does not disrupt entirely. Incidentally this characteristic is noticeable in forged duralumin rods when subjected to the engine speeds of present racing practice. One designer having some limited clearances at the piston and cylinder heads nearly ruined an engine because the rods stretched and caused interference.

Another sidelight of the race was the total absence of any but wire wheels. Even up to last year several cars had wire wheels on the front ends and disks at the rear. Balloon tires were used on all cars. While tire sizes showed some variation, practically all of them were mounted on 20 in. base and had a nominal outside diameter of 30 in. The Hamlin front drive carried 28 x 4 tires. Inflation pressures varied from 45 to 50 lb.

One of the centers of interest at the track was the Miller front-drive car. Two of this type were entered with Cooper and Lewis as pilots. Pre-race sentiment generally picked one of these jobs as the winner. These cars carried the new Miller engine of 2 3/16 in. bore and 3 in. stroke. Due to the front drive arrangement, the engine was reversed, bringing the supercharger and carburetor at the front end. All of the new Miller engines have the supercharger driven by a separate train of gears from the crankshaft. Two gears drive the final gear on the impeller shaft so that the bearing load is balanced to better advantage. The new engine is credited with being somewhat faster than the rebuilt jobs.

Some changes had been made in the front-drive layout although the general arrangement was in line with previous descriptions. Block and trunnion joints had supplanted the former fabric joints at the inner ends of the drive shafts and ball bearing universal joints were placed in the front wheels with some improvement in handling characteristics. The center section of the tubular front axle bolted and piloted into the ends to facilitate dismounting for changing gear ratios. Internally, the gear set was modified so that the countershaft is stationary when the drive is in top gear. The magneto was removed from its earlier position between the driver's feet and located on the front end of the engine.

Miller Stroke Reduced

As explained previously, the rebuilt standard type Miller cars retain the old bore, 2 11/32 in. but the stroke has been reduced to 2⅝ in. One of the older jobs, the Abell Special, which was Miller-built, liners were inserted to bring the engine to the new displacement requirements. In the older Miller designs, the supercharger is driven from the rear ends of both camshafts. A change was made in the intake manifold this year as the outlet pipe of the supercharger connects to the center point of the intake manifold and the trombone effect of last year when the supercharger connected to the rear end of the manifold, was discarded.

Duesenberg used new cylinders and a new crankshaft. Due to the smaller dimensions of the new cylinder, he discarded the former detachable head in order to combine compactness with assurance of liberal water passages. Slight modifications were made in the supercharger and its drive but the essential features with the exception of the double outlet were the same. Ball bearings are located at the front and rear main bearings. The plain center bearing which forms the oil line joint between the case and the shaft is mounted in a barrel carrier while the intermediate bearings are mounted in piloted forged spiders.

These two makers accounted for almost all of the American entries. Another was the K and M Special which carried a four-cylinder engine of 2.585 in. bore and 4.3125 in. stroke. Single intake and exhaust valves were used and the arrangement and drive resembled Duesenberg and Miller. The supercharger was mounted on the front end of the engine and driven by a separate train of gears in front of the timing train. Aluminum alloy pistons were at the heads of tubular steel rods.

The Hamlin Front Drive

Another front-drive model was the Hamlin entry made by Louis Chevrolet. In this job, many standard Ford parts were used. The engine and planetary transmission unit were turned around and drove a Ford differential unit through a universal coupling. The engine was rebuilt with heavier crankshaft construction and a vertical gear train which drove two overhead camshafts in a V arrangement. Four valves per cylinder were used. A Roots blower supplied the intake line. Cylinders were reduced to 2⅞ in. diameter and the stroke was 3½ in. Two parallel tubular members which formed the front axle were bowed to clear the central differential unit and Ford rear springs were used front and rear. Double radius rods were mounted on both front and rear axles. Flexibility of the drive from the front differential unit to the driving and steering wheels followed the Miller arrangement in principle.

Of the foreign cars, Guyot and Schmidt were practically identical and have been described in a previous issue of this publication. They were fitted with engines of the single sleeve valve type. The Eldridge cars also were described in an earlier issue.

Failing to get in the first ten money positions, but still running at the end of the race were Hill in a Miller Special, Gulatto in a Miller Special and Houser in an Abell Special. The Guyot Special dropped out after completing only eight laps. One Schmidt Special quit after 41 laps and the other after 44 laps. The two Eldridge Specials called it a day after making 44 and 91 laps respectively.

Prominent men of the automotive industry from all parts of the country on the night of May 30 made the second annual before-the-race-dinner of the Indiana Section, Society of Automotive Engineers, the most brilliant affair of the Section's history. Arthur Brisbane, noted writer, speaking on what the automotive industry has done for man, called the engineers and the men of the industry the world's foremost emancipators, who have lifted men out of their ruts, and made their desires expand until they work to have all the things their motor car vision gives them. F. E. Moskovics was toastmaster.

Capt. E. V. Rickenbacker told some of the early racing history of cars that he and Mr. Moskovics piloted when they were active on the speed tracks.

C. F. Kettering gave a talk on the benefits of modern science to labor. He said one American automotive worker makes ten cars a year while foreign workers make about a thirtieth of a car each.

Among the guests at the speakers' table were: T. J. Litle, Jr., president of the S. A. E.; T. P. Henry, president of the American Automobile Association; Arthur Nutt, chief engineer of the Curtiss Aeroplane Co.; C. A. Musselman, president of the Chilton Class Journal Co.; Charles Guernsey of the J. G. Brill Co.; Coker Clarkson, general manager, S. A. E.; Col. Thomas Hetherington, air attache of the British Embassy, Washington; Capt. C. B. Wilson, John Hunt, vice-president of General Motors Research Corp., and Ralph R. Teetor, new chairman of the Indiana Section, S. A. E.

LEFT: *Traffic congestion during the general strike in England. This scene was taken at Westminster Bridge, near the House of Commons. Note loaded condition of all vehicles.* RIGHT: *Motor vehicles mobilized for emergency transport duty at famous Horse Guards.* BELOW: *A Government lorry transporting workers in the Kingsway district*

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Recent Strike Hasn't Affected Market for U. S. Cars in Britain

Demand if anything will be stimulated as public has seen how essential motor transport is to prosperity of nation. Sales off temporarily during general tie-up.

By E. C. Petrie

IT is apparent that the sales of American automobiles and trucks in Britain will not suffer in the long run through the incidence of the recent general strike. The public generally has come to appreciate more than ever the value of road motor transport to the community, and the return of the nation to a state of normality, coupled with the increased strain on vehicles during the period of the strike, will result in considerably accentuated sales.

During the days of the strike Great Britain lived in the 17th century so far as communications were concerned, and the experience is sure to drive home to the average Briton how essential the motor vehicle is to the prosperity of the country.

Millions of work-people not actively concerned in the strike were forced to play a passive part because of their inability to follow their occupations punctually and regularly, due to the tie-up of rail transport facilities.

The disabilities suffered by the nation as a whole had a proportionate effect on the motor trade of the country. Many prospective buyers temporarily cancelled their orders, while innumerable dealers found it impossible to get delivery of vehicles already ordered. As the railways were not operating, the collecting of automobiles meant two men had to be sent by motor to the factory in order that the extra man might drive the new vehicle on the return journey.

Because of the complete cessation of trade publications and the restricted size of the daily papers during the strike, it has been impossible up to this writing to ascertain just how far British manufacturers were affected. It is safe to say, however, that production was very considerably curtailed, while it is no doubt equally true to say that some factories experienced a complete stoppage.

In order to get an impression of the effect on the business of American automotive concessionaries in this country, the writer circulated a questionnaire and digest of the replies is given here.

Auburn Cars, Ltd., stated that while the strike was in progress no consignments were landed and nothing came in from the docks. No trouble was encountered in assembling, but sales were slow, mainly because the range of deliveries was limited.

Studebaker of Great Britain, Ltd., reported that the consignments that arrived during the strike period were not landed. No trouble was experienced with regard to assembling, and the whole of the organization carried on normally. No appreciable falling off in sales was reported, and no difficulty was felt in effecting deliveries. During the strike period a full range of all models was available at the Pound Lane works.

Durant Motors, Ltd., stated it was affected but slightly by the general strike. During the first week the volume of business fell off very much. Later there was every

indication of a return to normal, except that difficulty was experienced by dealers in getting their drivers to the works for the purpose of collecting cars. So far as is known, no consignments reached England during the strike, so that it is impossible to say whether difficulties would have been experienced in getting cases from shipside to the assembly shops at Chiswick. Assembly was carried on without interruption, and no efforts were made by strikers to dissuade Durant men from keeping at work.

Shipments Held Up

Major B. C. Crossley, sales manager of Willys-Overland Crossley, Ltd., states that ships with consignments were not docked. Mechanical assembling continued in the factory, but all bodywork, upholstering, trimming, and finishing had been interfered with owing to the workers having gone on strike. Sales were slow. Deliveries were bad, as only urgent orders were collected. Generally speaking, it was practically impossible to do business during the strike. Mails came in as many as four and five days late, and the Government's request not to use the telephone and cable service unless essential was acceded to. All field representatives were called in, as the dealers showed little desire to see them.

American Motors Export Corp., Kissel concessionaires, stated that no consignment was due during the strike. Labor at their service depot was on strike. Sales have been held up and customers seemed unwilling to enter into commitments.

Harris & Hasell, Ltd., Bristol, concessionaires for Reo automobiles and Speed Wagons, reported that shipments of chassis all come across by the Bristol City line from New York to Bristol docks direct. Consignments were landed by volunteer labor, and, as the police guaranteed protection, chassis were got to the assembling shops. The Harris & Hasell staff is exclusively non-union, and owing to their loyalty operations were virtually normal. Sales were rather slow but this is attributed more to the recent extension of the McKenna duties to commercial vehicles than to anything else. Deliveries were available for all chassis except the Reo Pullman.

This firm considers that there is a decided advantage in getting shipments direct to Bristol, as it does not seem to have had to deal with anything like the amount of trouble that was experienced in London. The firm declares that it has always considered that it is most advantageously placed for import business in Bristol..

A concessionaire for American cars and trucks, located at Liverpool, said that consignments were landed and conveyed from shipside to works by truck. No trouble was encountered in assembling, and sales were normal.

Shop Conditions Normal

A concessionaire of a leading American make of truck, while desiring to remain anonymous, stated that he had no occasion to clear chassis during the strike. Some cases of spare parts were in the docks, but owing to the fact that volunteer labor was concentrating on clearing and conveying foodstuffs, it was not expected that these would be received. Had chassis come in from the docks during the period of the strike no difference in the time of erection or procedure would have been experienced, as shop conditions were normal throughout.

The usual number of inquiries for new trucks was received, suggesting that users had in mind the possible scrapping of old trucks which had been pressed into use and would be fit for no further service after the strenuous use to which they were put during the strike. Another reason for these inquiries might be that fleet owners desire to know whether any chassis are available at pre-budget prices. The range of deliveries was limited.

WHILE the general strike in England was speedily ended, the dispute which caused the general cessation of work, centering around the Government's coal subsidy, remains to be settled and pending a settlement the miners are still idle.

Until the miners resume work the industrial situation will remain somewhat clouded as coal stocks are reported dwindling and many manufacturing plants are crippled by the shortage.

Before the strike the number of unemployed in England had fallen below the million mark, but it is estimated that nearly 1,700,000 are now jobless.

In view of this situation, the temporary lull in automobile sales, referred to by Mr. Petrie, may be of longer duration than expected at the time this article was written.

Another anonymous concessionaire for American tractors and trucks stated that consignments were not landed and chassis were not being received at the works. No trouble was encountered in assembling, but no deliveries were being made.

Yet another truck concessionaire said that the last consignment due from America was received and cleared just before the strike began. Thus no difficulty was experienced in collecting shipments. No trouble had been experienced with regard to assembling, except that delivery of parts obtained in England was delayed. This firm also found it impracticable to deliver spare parts to customers except in the immediate neighborhood, owing to the cancellation of parcel post facilities. Sales and deliveries were, generally speaking, normal, but the recently imposed tariff on trucks was having a depressing effect.

The Four Wheel Drive Lorry Co., Ltd., stated that no consigments were landed during the strike so far as was known. The factory was running with a full force, and no difficulty was met in assembling or manufacturing. Some fitters left for a few days, but soon returned to work. The men were not in favor of the strike, and sought every possible excuse for remaining at work. Sales were curtailed except in a few emergency cases. Deliveries were limited only in certain cases at the beginning of the strike; later customers themselves called for their vehicles as they were finished.

As the Ford Motor Co. (England), Ltd., Trafford Park, Manchester, turns out its vehicles with practically 100 per cent British materials and labor, the only problem that had to be solved was the unloading of forgings and castings from the foundry at Cork, Irish Free State. This was satisfactorily done, without any trouble, by the company's own workmen. No difficulty was met with regard to building and assembling, as Ford employees are paid well above union wages and were not affected by the strike. Sales were maintained, the only trouble experienced being the effecting of deliveries. There was an increased call for trucks. Where it was necessary to bring parts and material from other parts of England and Scotland this was done by road transport, and work continued normally at the factory throughout the strike.

Railroads Turning to Heavy Oil Engines for Locomotive Service

Powerplants of oil-electric type offer advantages of more economical operation, reduced maintenance costs, elimination of much capital investment.

THE heavy oil type of internal combustion engine has entered a new field—that of rail locomotive service. Although the first oil-electric locomotive was placed in service less than a year ago, there are already ten railroads of the East and Middle West either operating or awaiting locomotives of this type.

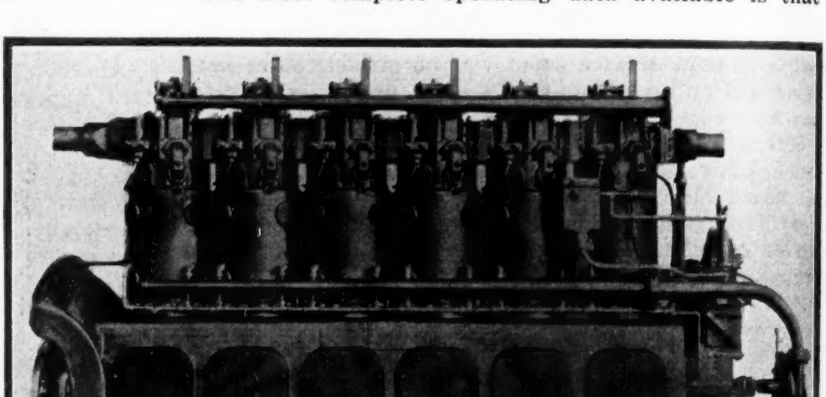
In this development an internal combustion engine, using low-cost fuel, drives an electric generator which furnishes power to electric motors geared to the axles of the driving wheels. The advantages claimed for it are more economical operation and rapid acceleration, reduced maintenance costs, absence of smoke and noise and virtual elimination of capital investment other than the first cost of the locomotive itself.

Specifically, the claims made for oil-electric locomotives, and which led a number of railroads to consider their use, include the following:

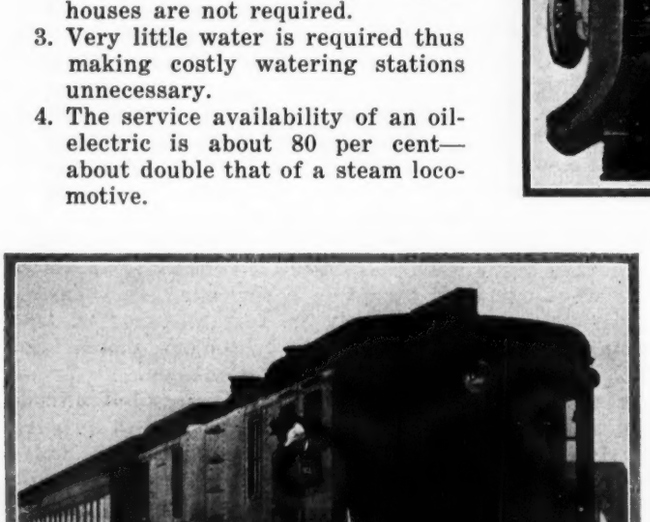
1. Fuel cost of operation is from one-third to one-sixth that of an equivalent steam locomotive.
2. Coaling plants, ash pits, turntables and circular type engine houses are not required.
3. Very little water is required thus making costly watering stations unnecessary.
4. The service availability of an oil-electric is about 80 per cent—about double that of a steam locomotive.
5. Use of smaller mechanical parts removes necessity for heavy shop machinery.

The oil-electric provides uniform continuous torque at the wheel rims and provides much higher tractive effort at starting and slow speeds on light axle loads than does a steam unit. The oil engine can be fully loaded at all speeds. The use of an electric transmission has the same advantages in the locomotive as it has in the familiar gas-electric bus.

The most complete operating data available is that from the Central Railroad of New Jersey which has been using a 60-ton oil-electric locomotive at its Bronx terminal in New York City since November of last year. Comparative data for a month of continuous operation give an operating cost of $72.58 for the oil-electric as compared with $349.46 for a steam locomotive doing the same kind of work. It was demonstrated early in January of this year that a 60-ton oil-electric can make a long run at an average fuel cost lower than that of a Ford automobile. On a run of 733 miles the entire cost of fuel and lubricating oil consumed was $8.75.



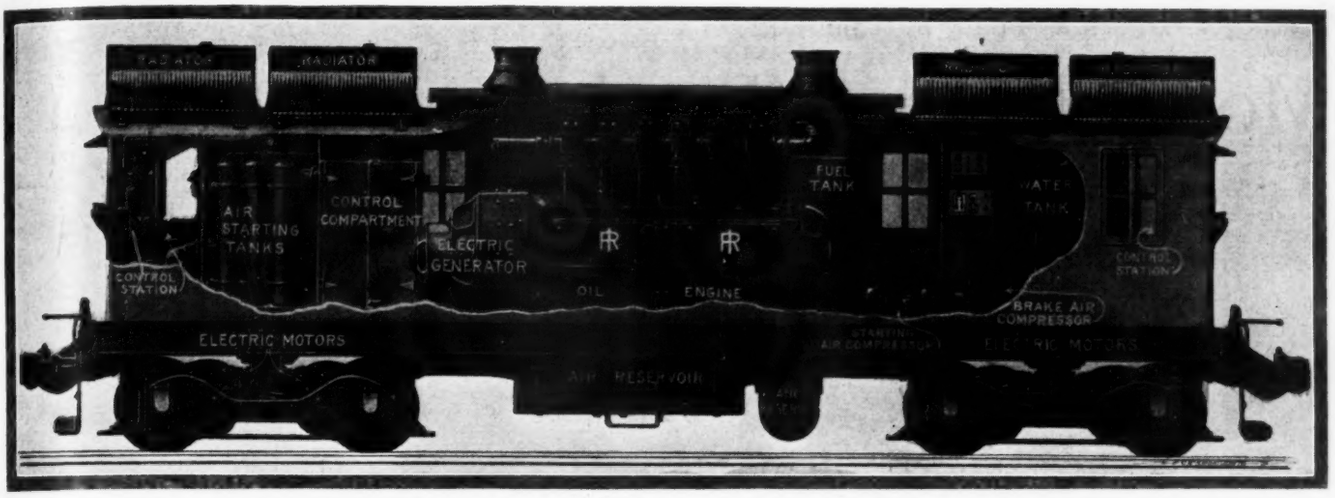
300 horsepower Ingersoll-Rand oil engine used in 60-ton oil-electric locomotive.



100-ton oil-electric locomotive now in service on the Long Island Railroad

In another test a 100-ton locomotive, now in service on the Long Island Railroad, made a run of 537 miles hauling a loaded freight train at an average fuel cost of five cents per mile. A previous test showed this locomotive, with a trailing load of 1315 tons, starting from standstill on a one per cent grade and accelerating up the grade to a speed of six miles per hour.

These locomotives are the joint product of the Amer-



Sectional view of 60-ton oil-electric locomotive showing location of equipment

ican Locomotive Co., which makes the mechanical structure, the General Electric Co., which furnishes the electrical units, and Ingersoll-Rand Co., which provides the oil engine.

The oil-engine is of the vertical, six-cylinder, four-cycle, single-acting, variable speed type having direct fuel injection. Cylinders, cylinder heads, and combustion chambers are completely water jacketed.

Fuel oil injection is accomplished by means of two opposed spray nozzles in each combustion chamber to which oil is delivered under pressure by an injection pump driven from the main shaft. Ignition is produced by the heat of compression only.

One fuel injection pump serves all cylinders. The fuel oil distribution is obtained by a distributor timed to admit oil to the spray nozzles of each cylinder in their proper firing order.

The lubricating system is entirely enclosed and of the force feed type. Lubricating oil is pumped to the moving parts of the engine by a gear-driven pump in the crankcase. Oil in contact with the cylinder walls is passed through a filter and returned to the crankcase oil reservoir.

A closed cooling water system is used on the engine. The water is circulated by a centrifugal pump driven from the crankshaft. The temperature of the water in the engine jacket is regulated by a thermostatic valve, which controls the circulation of the cooling water from the engine to radiators on the locomotive roof.

To start the engine, compressed air at approximately 200 lb. pressure is admitted to each cylinder in succession through mechanically operated starting valves. While in operation the engine drives a small air compressor which maintains pressure continuously in the starting reservoirs.

600-Volt Generator

The generator is a 200-kw., 600-volt, direct current, compound-wound, commutating pole unit, separately excited. The generator, together with its exciter, is specifically designed for this service and is direct-connected to the oil engine. The combined characteristics of generator and exciter are such as to produce a machine of practically constant output. The voltage of the generator is regulated by the current demand of the traction motors, so that, making due allowance for the generator losses, the product of this current and voltage is equal to the engine power. The kw. output of the generator varies with the output of the engine, and at any position of the throttle it is constant throughout the whole working range of the power plant.

A 6-kw., 60-volt exciter is mounted on the same shaft with the main generator and serves to excite the field windings of the main generator. A 32-volt storage battery is charged by this exciter through one of the field windings in series. The exciter and storage battery circuit is controlled automatically by a switch on the main throttle of the locomotive.

Control Extremely Simple

With this generator the control of the locomotive becomes extremely simple. There are two control handles. One is a throttle lever which controls the output of the engine. The other is a master controller, or electric switch handle, which connects the traction motors in series or in a parallel for forward or backward motion. No rheostats are used in the power circuit, which reduces to a minimum the loss of power during acceleration.

In operation, the electric control handle is set for forward or backward motion, with the motors in series for speeds below 5 miles per hour or in parallel for speeds above 5 miles per hour. The position of the throttle lever now determines the power delivered by the engine, and the generator and motors transmit that power to the driving wheels, automatically adjusting the proportion of tractive effort and speed to the load on the locomotive and automatically changing these proportions to suit the varying requirements of acceleration or grade.

The locomotive is equipped with four motors mounted on the trucks and geared to the driving axles. This motor is of the series-wound, totally enclosed, commutating pole, split frame type.

The axle brackets and suspension lugs, being on the lower frame, make the motor readily accessible for inspection and repairs. A large hand hole, fitted with a dust-proof cover, is provided from the commutator end, through which the commutator and brushes may be inspected. The armature is carried in separate heads clamped between the motor frames and is provided with self-aligning frictionless bearings.

ACCORDING to an announcement published in the French *Moniteur Officiel*, wheel rims for automobiles come under the heading of detached pieces intended exclusively for repair work and for that reason are subject to a duty of only 1.30 per cent, no distinction being made as to whether or not they are to be used on luxury vehicles.

Morris 1½ Ton Truck Furnished With Either Four or Six Wheels

British firm also introduces one-man army tank which uses same engine as truck and which is convertible for farm tractor service with speed of 30 m.p.h.

By M. W. Bourdon

A NEW 1½ ton truck which can be furnished either with four or six wheels and a one-man tank which uses the same engine as the truck and is convertible into a farm tractor are recent developments of Morris Commercial Motors, Ltd., Birmingham, England.

The largest type truck hitherto made by this organization has been the one-tonner, with a unit engine and gearset practically identical with that of the 14 hp. Morris passenger cars.

The new model has a four-cylinder engine of 3⅛ x 4⅞ in. bore and stroke, which develops 17.5 b. hp. at 1000 r.p.m. and 35 b. hp. at 2000 r.p.m. though the peaks of the power and torque curves are a good deal above the last mentioned speed. A maximum torque of 95 lb. ft. is obtained.

The cylinder block and upper half of the crankcase are a unit of cast-iron, with a detachable head and valves slightly inclined on the left of the block. An aluminum casting for the combined lower half of the crankcase and the sump is extended to form the lower half of the flywheel casing, the upper half being a unit with the cylinder casting. The gearset, with four speeds and central control, has a full bell-housing bolted to the flywheel casing with a handhole for clutch inspection. The power plant is three-point suspended in the main frame, the gearset overhanging behind bracket supports integral with the clutch casing. At the front is a trunnion support, while a rubber buffer is fitted between the left hand rear bearer arm and the frame.

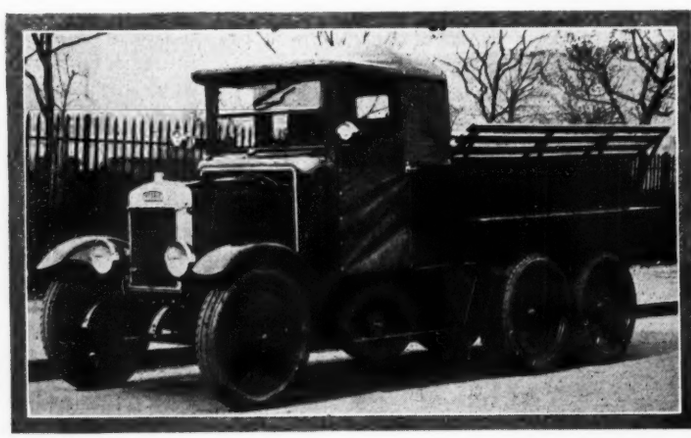
Straight-sided aluminum pistons are fitted and H section steel connecting rods. The crankshaft is carried in three bearings. Oil is delivered under pressure to the latter, to the camshaft bearings and to the helical timing gears, but splash from troughs is depended upon for the big ends, etc. The pump is of the plunger type, operated by an eccentric and strap from the center of the camshaft. Ignition is by magneto, the spark plugs being approximately central over the pistons.

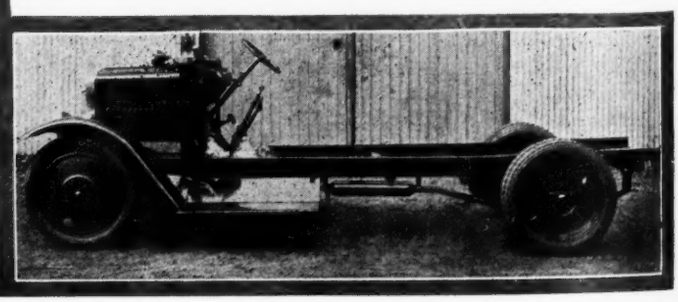
The magneto is driven in tandem with the generator on the left of the crankcase, its driving shaft extending forward of the timing case to operate a Maxfield air pump for tire inflation. A gear type clutch is provided for this pump. Departing from previous Morris practice, the starting motor has a Bendix drive and is piloted into the flywheel casing; on other models a motor generator drives the rear end of the crankshaft through a silent chain.

Water circulation is effected by an impeller on the rear end of the fan shaft, with a rubber belt drive from a pulley at the front end of the camshaft. The radiator has vertical gilled tubes with aluminum tanks and has a capacity of 4½ gal. Fuel feed is by gravity from a dashboard tank holding 8 Imperial gal. The carburetor is on the right of the cylinder block, bolted to the flange of a transverse passage in the latter. On the left the mixture issues into a branched manifold leading to ports between the first and second and the third and fourth cylinders. Separate exhaust ports occur for the four-branched manifold.

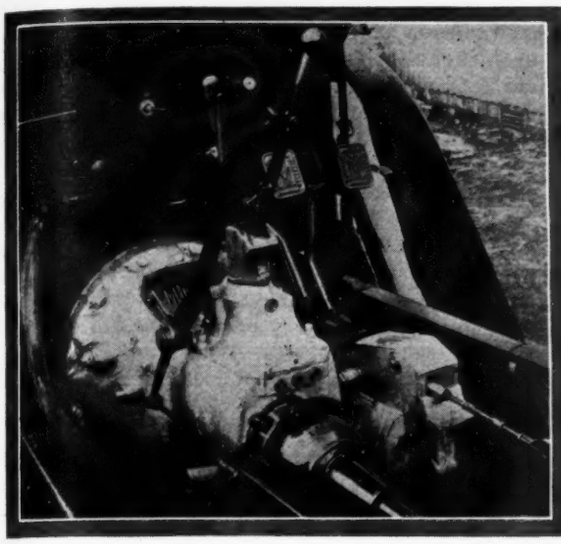
A governor is fitted, operated by a connection with the speedometer drive off the gearset and a novel feature in this connection is that the governor takes effect in cutting off the fuel supply by depressing a tapered needle into the jet orifice of the single-jet Smith carburetor. Besides preventing an excessive maximum speed, it is claimed that this scheme encourages fuel economy.

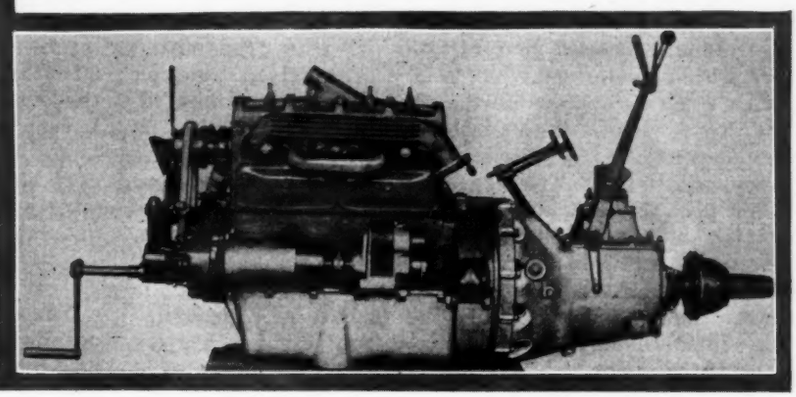
The single-plate dry clutch is self-contained as to end pressure and has a series of eight springs applying directly to the circumference of the rear driving plate. The four-speed gearset affords the following ratios:





At the left is the new 1½ ton Morris truck, six-wheel model. Apart from the duplication of the rear axle and the necessary modification of the rear suspension, the chassis features are identical with those of the four-wheeler, shown below





Left: View of new 1½ ton Morris truck chassis showing arrangement of Dewandre vacuum servo brake equipment alongside four-speed gearset. Below: Engine and four-speed gearset

High, direct; third, 1.7 to 1; second, 2.4 to 1; first, 3.45 to 1, and reverse 4.25 to 1. The ratio of the overhead worm final drive is 6.25 to 1.

From the gearset a short intermediate shaft leads to the propeller shaft proper, the latter being unenclosed. Three metallic universals are used, the central unit being supported by a deep cross member of the frame. The three-quarter floating type rear axle has parallel tubular extensions from the cast steel center casing. Double ball bearings are used for the outer ends of the 1⅜ in. diameter drive shafts.

Half-Elliptic Rear Springs

Torque and drive are taken through the half elliptic rear springs, which are underslung and consist of 11 leaves 2¾ in. wide and 48 in. long. The springs are anchored to pressed steel brackets riveted to the side members of the frame and stiffened by extensions of cross members that are carried under and beyond the side members.

The rear brake drums, of 15 in. diameter, contain two sets of shoes, one set operated by hand and the other by pedal, though when four-wheel braking is fitted (at £30 extra to the normal chassis price) the latter set is coupled to the front brakes and actuated by a Dewandre vacuum equipment. The type of front brake adopted is the Rubery, as in other Morris trucks and passenger cars. Cable compensation occurs between the rear brakes and also between the front and rear sets.

Hollow steel-spoked or disk wheels are optional, the tire sizes varying according to the length of wheelbase, for two optional lengths are available for the latter, viz., 122 in. and 138 in. The short chassis has 33 x 5 in. straight-side cords and the long chassis 32 x 4½ in. twins at the rear. Adjustment is provided for the rake of the steering column, while worm and full worm wheel gearing is used.

The following leading particulars may be given:

Overall length: 193 in. (long wheelbase), 177 in. (short wheelbase).

Dashboard to end of frame 148 in. and 132 in.

Track 56 in.

Height of frame, empty: 26½ in.

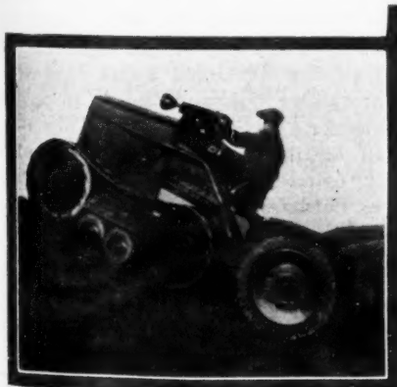
Minimum ground clearance: 10 in.

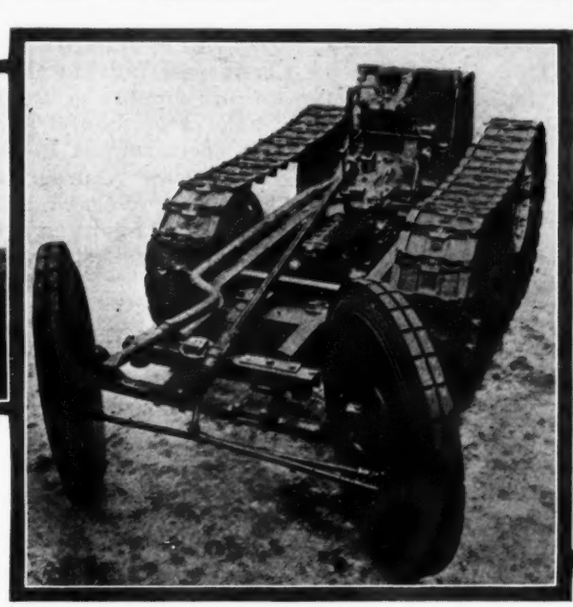
Diameter of turning circle: 42 ft.

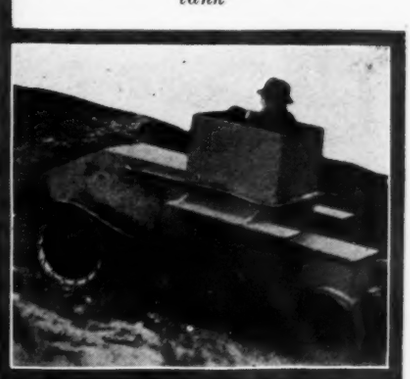
Chassis weight 2760 lb. and 2700 lb.

In addition to the standard four-wheel chassis, a six-wheel model has been prepared. The two rear axle casings are connected by pairs of parallel and inverted half-elliptic springs, swung on trunnions attached to the side frame members, while the central worm drive axle is connected to the rear one, also worm driven, by a short universally pointed and enclosed shaft.

Using the same engine and transmission as in the new







Right: Chassis of Morris one-man tank and farm tractor. Above: The tractor rigged up for farm duty

Below: The Morris tractor as a one-man tank for military service. The seat is adjustable so that the driver can lower himself into the tank

1½ ton truck, the company, in conjunction with a Major Martell, has produced a one-man tank that can be depleted of its armor plating and utilized as a farm tractor. As seen in the accompanying views, it is distinctive in being steered by a pair of rear wheels located behind the chain tracks provided for propulsion.

From the power plant, comprising engine, clutch casing and four-speed gearset, the drive is transmitted through epicyclic gearing to a worm driven axle on which the rear wheels of the chain track are mounted. The front wheels of the latter are idlers, and like the rear ones are rigidly attached to the channel frame. The bogey wheels under which the chain tracks run and which take the load are sprung on semi-elliptic springs running outside the main frame members of the chassis.

With the radiator placed in the conventional position, the actual mechanical parts of the chassis perform their conventional purpose, though the absence of a propeller shaft in the usual sense and that of universal joints are to be noted. For the rear steering, an axle of the type normally fitted to the front of a light truck is mounted at the rear on quarter-elliptic springs. The steering column runs centrally and diagonally from the back to the center portion of the vehicle, terminating at its forward end in a chain sprocket, a chain serving to convey the necessary motion from the steering wheel, which is mounted on a short stub to the dashboard.

The driver sits with the gear levers and brake lever between his legs and the normal pedal arrangement is modified to enable him to obtain suitable control. The back axle gives a reduction of 8.33 to 1, and without the intermediate epicyclic gearbox the ratios are 8.33, 14.10, 20.05 and 28.71 to 1. With the epicyclic gear in action the overall ratios are 24.45, 41.3, 53.7 and 84 to 1. The lowest of all gears is the indirect reverse which is 109 to 1. As can be imagined, the vehicle has a particularly good drawbar pull, this on test proving to be approximately two tons direct effort. The maximum speed over flat field land is in the neighborhood of 30 m.p.h.

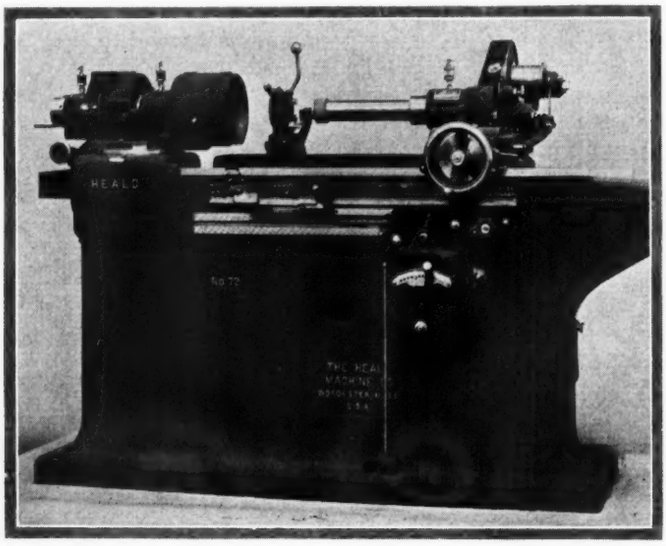
Rearing-up is Prevented

The object of the rear pair of wheels is to prevent all possibility of the vehicle as a tractor rearing-up when load is applied, as sometimes happens with rear wheel driving tractors. As a tank, the vehicle has proved itself to be remarkably easy to maneuver, while the shortness of the effective wheelbase enables it to turn in a very small circle. The British War Office tests of this tank have given very promising results and there is a likelihood that it will be adopted and more or less displace cavalry in certain fields of operation. A point of note is that the height of the driver's seat, when the vehicle is arranged as a tank, can be lowered instantly by means of a lever, to bring his head below the top of the armor plating.

Internal Grinder for Long Work

FOR long internal grinding jobs, the Heald Machine Co. of Worcester, Mass., has brought out a modification of its No. 72 hydraulic internal grinder. The base has been lengthened and the machine is capable of grinding holes 22 in. long. For work where the grinding operation extends over a depth of close to 22 in., a machine of the type illustrated, similar to the No. 72 Heald internal grinder, is recommended, while for cases where there is a length of not over 6 in. to be ground at the bottom of a deep hole, the Size-Matic features can be applied and the hole ground automatically.

The machine is so arranged that center rests can be easily applied. With most long work it naturally is important that center rests be used, especially when the work



is gripped in a three-jaw chuck. These center rests must be made special for each job.

This machine can be furnished also with a large workhead having a hollow spindle. This permits of inserting the work in the spindle and holding it in that position. In this case too, the workhead will have to be made special, depending on the work the customer has to grind.

A NEW electric timing device for races, etc., has been developed by F. L. Loebner, of Berlin, Germany. It comprises three instruments, viz., a large secondary electric clock chronograph, a main clock and a start, duration and finish-register. The large secondary chronograph is operated by 12-volt battery current and has a dial of from 16 to 80 in. diameter, which is divided into 60 minutes and fifths and tenths of seconds. The clock has three hands, one minute and two seconds hands. The main clock is arranged to operate or control a number of secondary clocks and registers. The entire equipment is portable.

The timing system is started either by pressing a contact or key, or automatically by the car running over a board or hose. One hand counts the minutes, the other two count the seconds and tenths of seconds on the dial, which is divided accordingly. The third (seconds) hand, which is red, can be stopped at will by means of a contact and be started automatically when the other seconds hand passes it. In this way start and finish differences of any number of starters can be timed by setting the hands accordingly, announcing the results at once to the spectators at a distance.

The time recorder, in addition to registering every minute and second in figures, also prints the starting times and the differences between the finishing times of any number of starters. All records are made on a wide tape.

Macbeth Leaves Dunlop Co.

An article in our April 29, 1926, issue, based on a paper by Colin Macbeth, British tire engineer, stated that Mr. Macbeth was on the staff of the Dunlop Tire Co. of England. We have since been advised by Mr. Macbeth that he severed his connections with the Dunlop Co. in December, 1924, and is now located in London as a consulting mechanical engineer, specializing in automotive tire and brake design.

Just Among Ourselves

When is a Record Not a Record?

IT'S interesting to note that in setting a new motor vehicle output record of 455,842 in April, neither the car nor the truck builders set a new record for their individual type of vehicle. Last October 408,017 cars were built as against 402,574 in April, while 60,482 trucks were built last September as against 53,268 in April. So the new record means simply that high schedules in both types of vehicles were synchronized in April, while peak demand had not come at exactly the same time before. Four months' passenger car production this year was about 19 per cent ahead of the same period in 1925. Trucks are up 12.7 per cent.

* * *

Truck Business Rumbles Ahead of 1925 by 12.7%

THE truck total of 53,268, as a matter of fact, can almost be counted as a new record because the high mark of 60,482 established last September was a result of an abnormal condition which came about because Ford's output was making up for production stoppages which had occurred in the previous month. With the exception of last September, the April truck output was higher by nearly 5000 than that of any previous month in the history of the business.

* * *

Pendulum Still Swings Toward Closed Cars

DOWN, down, down goes the percentage of open cars as compared to total production. Month by month, for more than a year, the proportion of closed jobs has continued to increase, regardless of season or weather. When the closed car first began to gain popularity its output tended to be affected by seasonal considerations. In the last year and a half, however, the general demand for closed types outweighed seasonal considerations almost entirely, so that the percentage decline of the open type has been practically uninterrupted during the months included in that period. Last year about 61 per cent of the total passenger car output was comprised of closed cars. Had Ford been left out of consideration, the percentage would have been about 69. This year again a very large increase in closed car proportions is indicated. A figure in excess of 70 per cent closed production is not unlikely for the industry as a whole, while 80 per cent average for makers other than Ford would not be surprising. And in the meantime, the used car marts r e m a i n more than capable of meeting any sudden open car demand which may develop.

* * *

Mr. Joyce Discovers a "Sandy Claus"

BROWN JOYCE of Wallace Barnes Spring Co. vouches for the existence of the Reception Room Monarch whom he portrays as follows:

"There is a 'Sandy Claus!'"

"Good morning! Yes, Mr. Byer is the purchasing agent but one of his assistants buys paper. Better see Mr. Dietz, he ought to be free in a few minutes now . . . . How do, Mr. Robin, who is it this morning? Two ahead of you; wait, I'll find out . . . . He'll be tied up most of the morning, can you drop around about two? Sorry, but maybe he'll have an order this afternoon to make up for the extra trip. The president is out of town; will you talk to his secretary? Mr. Harris is ready now, Mr. Drummer. No I don't know when the president will be back, his secretary can tell you that. My dear sir, I don't make the president's appointments, why not speak with—Good-bye. [That bird has been here five times to sell a hundred dollar service. But *he* has to see the president because *he's* High Power Harold and couldn't waste his time talking to the man who will decide the thing, Oh, well.] You've been waiting quite a while Mr. Daniels, let me find out how's chances. . . . . He's just finishing and you're next . . . . Well, Mr. Eby, where have you been for the last month? That's too bad, feeling all right now? You just sit down and I'll find out if he's ready. All O. K. Go right into his office . . . . Goodbye, sir. Thank you, I don't smoke—but I have friends who do. No, you keep it, but thanks just the same. Come again! . . ."

What kind have you met?

* * *

They Take Their Racing Seriously in Sicily

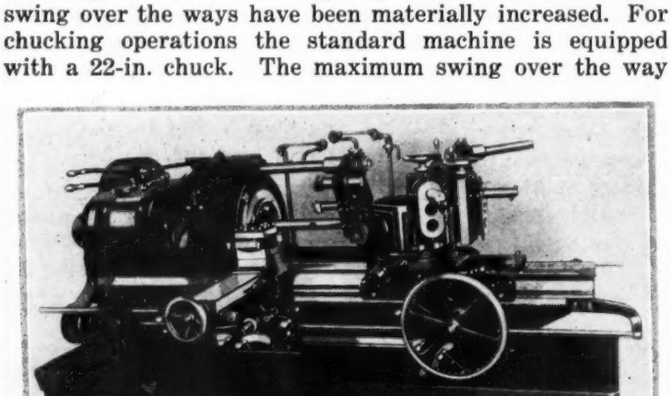
JUST as we get through printing an editorial pointing out some of the bad features of road racing and attempts to set up speed records over the open road, we find that in Sicily, where the recent Targa Florio race was held, an entirely different attitude is taken. There in the Madonie district, the town crier still exists as a regular institution. A few days before the running of the Targa Florio, according to *Allgemeine Automobile Zeitung*, the crier wended his way through the villages with the following message: "Sunday the automobile races will be run. Keep tied up at home all dogs, hens and children. Whoever dies, dies on his responsibility and the Mayor will shrug his shoulders." Certainly the Mayor can't be accused of making the government paternalistic.—N. G. S.

Bed Ways of New W. & S. Turret Lathe Protected by Covers

Enlarged 3-A type machine is also characterized by increased driving power, sturdy feed trains and an extreme rigidity.

AN enlarged No. 3-A turret lathe has been announced by the Warner & Swasey Co., Cleveland, O. This new machine is said to be characterized by great driving power, sturdy feed trains and extreme rigidity. It also embodies a method for completely protecting the ways from grit, chips and cutting lubricant, which is claimed to be an important improvement in machine tool design as it helps to maintain the alignment of the machine. All of the features of the 3-A turret lathe are retained, and the design permits the taking of "combined cuts" from the hexagon turret and the square turret at the same time. In addition, the tooling provides for "multiple cuts" from each turret station.

The new 3-A machine is adapted for both bar and chucking work, but the capacity for bar work and the swing over the ways have been materially increased. For chucking operations the standard machine is equipped with a 22-in. chuck. The maximum swing over the way



Above: Warner & Swasey No. 3-A universal hollow hexagon turret lathe

cover is 25¼ in., and the square turret carriage clears a diameter of 18 in. The hexagon turret carriage has a maximum longitudinal travel of 48 in., while the square turret has a cross travel of 12¾ in.

For bar work the machine has a capacity through the chuck for 7½-in. round bars, with a maximum turning length of 39 in.

The new (patented) way covers completely enclose the ways of the bed. All the ways of the machine are covered, even when the hexagon and the square turrets are working simultaneously, and for all positions along the bed. Grit, chips and cutting lubricant are prevented from reaching the surfaces of the ways, and wear from the continual dropping of chuck wrenches and tools is avoided.

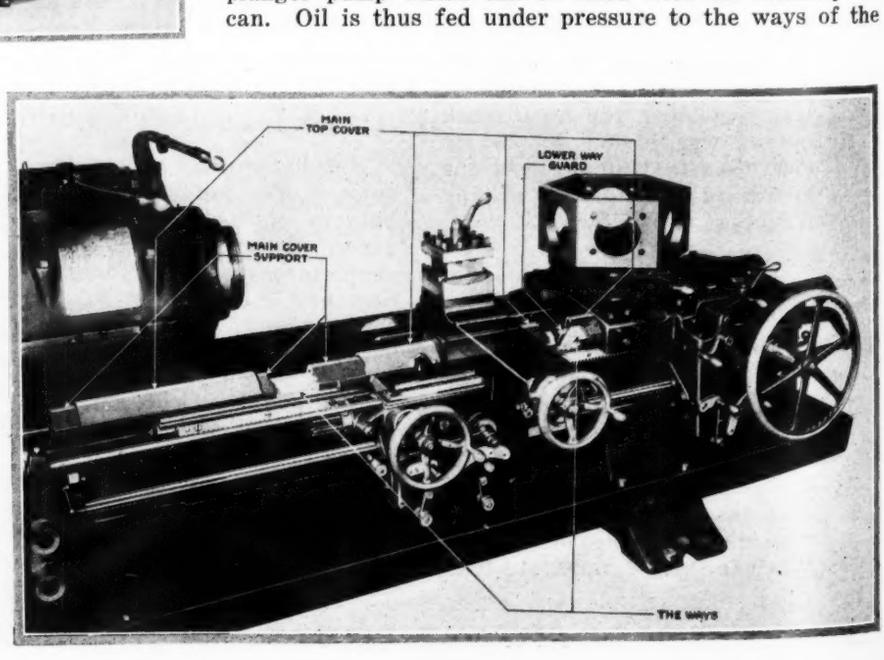
The construction of the way covers is shown in the illustration. The pressed steel main top cover runs the entire length of the ways, passing through an inverted "V" slot in the square turret carriage. The main top cover is fastened to the hexagon turret saddle, thus moving independently of the square turret carriage.

The left, or free end, of the main top cover is supported by the main cover support, a heavy cast iron member attached to the square turret carriage and moving with it. This support provides solid metal between the main top cover and the ways, so that heavy chucks may be mounted or heavy work gripped without damaging the way covers.

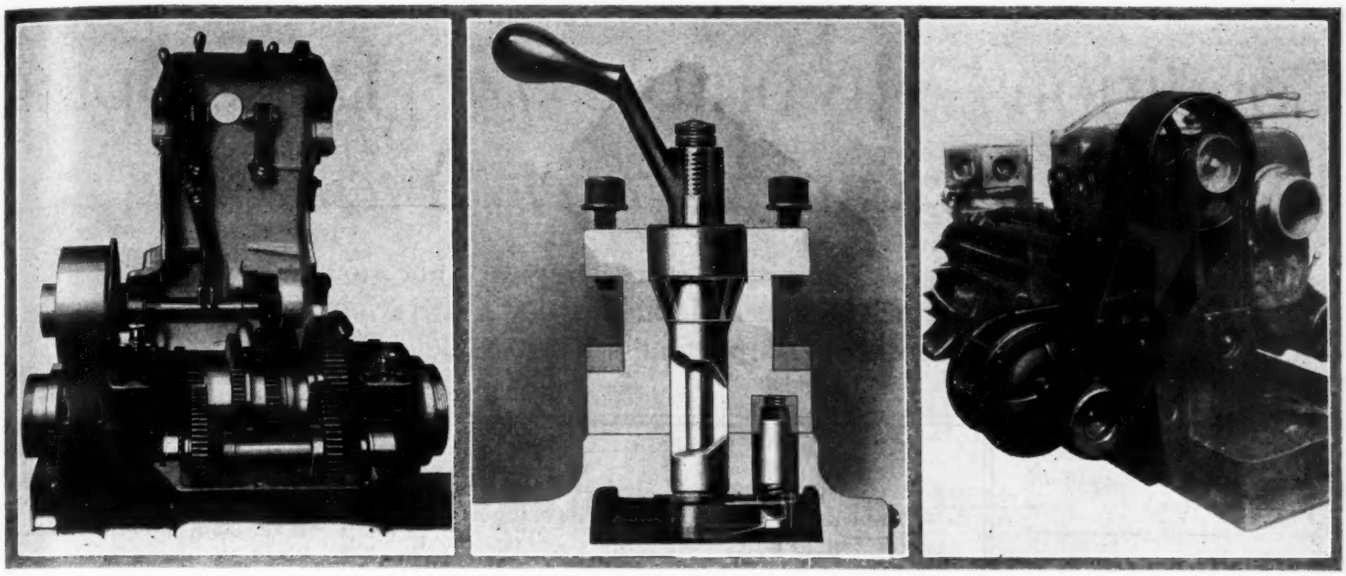
In order to prevent any chips from working up underneath the main top cover in the space between the hexagon turret saddle and the side carriage, a lower way guard is provided. This guard is attached to the right side of the square turret carriage, moving with it, and passing into a slot in the hexagon turret saddle.

The rear way at the back of the machine is protected by a heavy rolled cover which rests directly on the ways and passes through a tunnel at the back of the all-geared head. Two shorter covers are added at the back of the hexagon turret saddle to prevent chips from dropping off the tools on to the rear ways.

To ensure reliable lubrication of the ways, even though they are enclosed, the square turret is fitted with an oil plunger pump which can be filled with an ordinary oil can. Oil is thus fed under pressure to the ways of the



Right: Construction of the covered ways



The all-geared head *Phantom view of square turret* *The motor drive*

machine. The hexagon turret ways also are oil-lubricated.

The head of the machine is cast in one piece with the bed, as in all other machines of the Warner & Swasey type. The all-geared head is designed to produce ample power through a series of broad-faced, hardened and heat-treated alloy steel gears. These run in oil, and can absorb a maximum input of 25 hp., although a 10, 15 or 20 hp. motor may be used for the average range of light to heavy work.

Another new feature is that the front and back shafts and also the drive shaft run in taper roller bearings, with adjustment for end play. This construction makes possible a narrower arrangement of the head in the front and rear, so that the cap bolts of both spindle bearings are readily accessible.

The spindle is machined from a solid hammered billet by drilling out the core, and is ground on all outside diameters over the bar into gear diameters. Its nose is of an entirely new type. It is threaded for fastening the chuck securely to the spindle, but the pilot is tapered instead of straight. This gives a taper bearing for alignment for mounting chucks or fixtures, and is said to be extremely rigid. In case of wear, it is possible to dress up the taper and the front shoulder to a new fit.

Starting, stopping and reversing the machine are accomplished through a large, duplex clutch with bronze and steel friction members placed on the back shaft.

To insure the utmost rigidity the head is cast solid with the bed. The square turret carriage is anchored to a third rail or guide at the lower front of the bed. Thus the cross slide does not have to reach across the ways for rigid anchoring, and the spindle, the hexagon turret, and the square turret can all be brought close to the bed without sacrificing swing over the square turret carriage. This design also permits the square turret to be run out of the way to the extreme left and past the chuck when chuck and work are less than 18 in. in diameter.

The turret is of the familiar hollow hexagon type with broad faces to which the tools and holders are bolted from the inside. It is mounted on a heavy saddle which has its bearing directly on the ways of the bed. A vertical lock bolt, located immediately under the working tool, locks the turret accurately in any of its six positions.

To provide accurate alignment for heavy duty work, the turret is clamped to its seat by an outside split ring binding mechanism. This ring has a double taper which hugs the tapers on the saddle and turret respectively. A single lever is employed for operating the ring through a right and left hand thread, thus binding the two members together.

In order to lessen operating fatigue, a power rapid traverse has been provided for moving the turret with its tools to and from its working position. It can be stopped at any point, and on the return stroke away from the work the rapid traverse lever is kept in engagement automatically and is automatically disengaged at the end of the stroke without attention from the operator.

The hexagon turret is equipped with 16 feeds, eight of these being readily obtained by levers conveniently located in the turret apron itself. An additional lever operates a doubling gear located in the gear box at the head end of the machine, thereby making available 16 feeds ranging from 0.005 in. to 0.167 in. per revolution of the spindle.

The turret feed is engaged and may be reversed by levers also contained in the saddle apron. The feeds are automatically disengaged by adjustable stops on the roll located between the V's. The stops can be quickly set.

The square turret, which is mounted on the carriage, will hold four or more forged tools. The turret is indexed without being lifted from its seat, and can be clamped in any position by a quarter turn of the binder handle.

The new arrangement for feeds provides sixteen longitudinal and sixteen cross feeds for the carriage. These may be operated either forward or reverse. With the wide range of feeds, peripheral turning, cross facing or recessing operations may be performed by the square turret tools while the hexagon turret is engaged in drilling, boring or turning cuts.

The longitudinal feed to the carriage may be disengaged by six adjustable stop screws which are mounted on a revolving spool in the apron. To assist the operator in cross feeding, a large dial is mounted on the screw near the handwheel for accurately gaging the depth of the cut. This dial is graduated in thousandths, and numbered metal clips are provided for securing accurate repetition of settings.

The geared oil pump is coupled direct to the power traverse drive shaft and is of the blade type. It delivers lubricant at the rate of six gallons per minute. A plain countershaft equipped with oil-tight roller bearings in the hanger boxes and in the loose pulley is furnished as standard equipment.

Conditions Favorable *for* Developing African *Rubber Yield*

Production has diminished in recent years but survey by Department of Commerce indicates that cultivation might be carried on about as profitably as in Middle East area.

CAN rubber be produced in Africa in competition with the highly developed plantations of the Middle East? That is the question which the Department of Commerce has attempted to answer for the benefit of those interested in America's future rubber supply.

Several agents of the Department were detailed to the task of studying the conditions surrounding production in this area, and the accompanying article is a summary of their findings, taken from the official report of the investigation.

TWENTY years ago Africa was producing rubber at the rate of about 20,000 tons per year while at present production has dwindled to somewhere around 4,000 tons per year. Production 20 years ago was made up almost entirely of wild rubber while at present plantation rubber furnishes most of the crop. There are about 38,000 acres planted to Hevea rubber, most of it mature, since very little planting has been done since 1914.

Climatic conditions favorable to the growth of rubber are to be found in an area intersected by the equatorial line containing some 7,000,000 square miles and a population of about 78,000,000. Labor conditions are generally good; the various political units are uniformly favorable to the development of their territories under conditions protecting the rights of the natives, and there appear to be good reasons why rubber plantations could be developed in this area which would prove as profitable as those of the Middle East.

These conclusions may be drawn from "Rubber Production in Africa," the fifth of a series of pamphlets published by the Department of Commerce on the general subject of crude rubber. The information contained has been compiled and presented by H. N. Whitford and Alfred Anthony, special agents of the Department.

In the first decade of this century Africa carried on a considerable trade in wild rubber and was second to South America in the quantity produced. Since that time this production has fallen to a very large extent, due to two causes—low prices and the war. Production began to decline in 1914. This was due partly to low prices and partly to the cessation of activities in the German territories which had been very active in the past in producing rubber.

At about this same time considerable work was done by the various territorial governments in fostering cultivated rubber with the result that up to the outbreak of the war large areas had been planted. In Tanganyika —formerly German East Africa—over 113,000 acres had been planted by 1912 but, with the decreasing prices obtaining, much of this land was given over to other crops during the next two or three years and at the outbreak of the war they were entirely abandoned.

The wild plants producing rubber in Africa are of such nature that the cheapest method of collecting the latex is to destroy the plants and in spite of various laws prohibiting this practice it was continued to a large extent so that many of the wild rubber plants have been eliminated. Where it was possible to enforce these laws it was discovered that production diminished since even with the relatively high prices existing 15 years ago it was found that tapping the standing plants did not pay.

Presumably in some of the areas which were denuded of wild rubber plants by the collecting methods employed, new growths have replaced in part the destroyed plants but it is considered to be improbable that Africa will ever be able again to produce the quantities of wild rubber collected before the war.

Rubber plantings have been few during the last decade. This has been caused not only by the effects of the war but by the low prices prevailing. Both factors have tended to retard the growth of plantation rubber.

The Department's agents were unable to obtain any figures on production costs which were directly comparable with those of the Middle East plantations. With few exceptions rubber is grown in Africa intermixed with other crops. This practice reduces the cost of planting and caring for the rubber until it is old enough to yield returns. Because of this fact estimates of the cost of opening a plantation are very difficule to get, some planters in Uganda going so far as to say it costs nothing while others make estimates up to $75 per acre.

Although plantation rubber developments in Africa have not been successful the failure is not due entirely to economic factors or to adverse physical conditions. In 1914 the planting of Hevea rubber had assumed considerable proportions and plantings of less profitable species had declined. The war interrupted further planting and interfered with care and production of rubber on existing plantations. After the war, business depressions and other factors resulted in low prices for rubber which, again, retarded further plantings.

Whether plantation rubber can be grown in Africa in competition with the plantations of the East is uncertain. One American company which is operating a plantation in one of the Gulf countries has stated that its production cost per pound is lower than that which is accepted as reasonable by Middle East plantations. It is possible that planters elsewhere in Africa may achieve equally satisfactory results.

On account of transportation considerations it may be

expected that developments along the coast of the Gulf of Guiana will have a better chance of meeting competition than those in the interior districts.

Nearly all the countries of Africa where Hevea rubber might be produced have large indigenous populations. The task of getting the natives to work is a difficult one. Compulsion is out of the question since all the governments of the various territories protect the natives from any form of coercion. Persuasion is the only allowable method and that is not particularly efficacious in getting native equatorial Africans to work.

If they do work they prefer to do so on their own land, or if they work for others they do not wish to go far from home nor to stay away long. When labor can be obtained it is relatively cheap, the usual daily wage for agricultural hands being from 10 to 30 cents.

Large Areas Available

While the rights of the natives are closely guarded in nearly all of the political units of Equatorial Africa there are large areas of suitable rubber land which may be obtained through concessions, leases or purchase for plantation projects. The governments are generally favorable to such developments and restrictions are only aimed at protecting the natives and the natural resources of the country.

The climate in general was found to be favorable to Hevea growth and the investigators believe that latex returns equal to average yields of the Middle East plantations might be obtained without difficulty. Certain districts of the area, of course, would be better than others because of the variations in rain fall, temperatures, etc., and special consideration would have to be given to these details before any project could be definitely launched.

After a general summary of the conditions found in the equitorial belt, the pamphlet continues with detail data covering the various regions included in the survev. These are British Africa, French Africa. Belgium Africa, Portugese Africa, Spanish Africa, Liberia and the mandated countries. For each of these regions considerable information is given covering conditions of topography, climate. land tenure. labor. indigenous rubber plants, plantation projects, and other factors of similar value.

Leader Pin Die Sets

THE use of standardized die sets equipped with leader or guide pins, particularly those of the removable type, has the following advantages: Lower die cost and longer die life; lower die set cost due to standardized production; quicker set-ups in punch press; less die grinding and time lost for changing set up; elimination of die shearing.

Thus I. L. Kentish-Rankin summarized the features of leader pin die sets in a paper read before a recent meeting of the National Pressed Metal Society. Although leader pin die sets are almost as old as dies and punches it is only within the last four years that they have become a standard tool on a national scale, Mr. Kentish-Rankin said.

Leader pins are made necessary by the fact that the clearance needed between the ram and the slides of a punch is always greater than the allowable clearance between the punch and the die. Therefore no matter how carefully the presses have been adjusted or how carefully the die is set a shearing action between the punch and the die is of frequent occurrence and regrindings become necessary.

By the use of ground and lapped leader pins which fit into lapped bushings perfect alignment of the punch and die is assured and their life is greatly increased, while the stampings are more accurate than is possible otherwise. Mr. Kentish-Rankin cited several cases in which the addition of leader pins and bushings to die sets had greatly increased the life of dies between grindings.

According to Mr. Kentish-Rankin the location of the leader pins has no particular bearing on their effectiveness so long as the pins and bushings are properly fitted to start with. The use of bushings is necessary since the guiding of the leader pin is only as accurate as the part into which it fits and a hardened, ground and lapped bushing will be much more accurate and less subject to wear than the casting itself.

Removable leader pins are a recent development to permit dies to be removed and ground on a Blanchard grinder. By their use dies can be reground in a few minutes where it formerly required several hours on a reciprocating grinder.

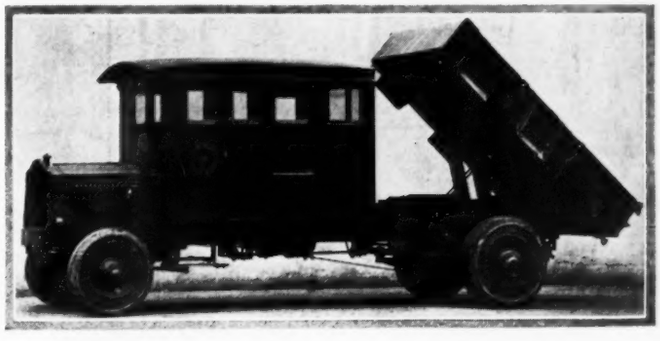
One manufacturer has found it possible to meet all demands for die sets with 12 styles and 97 sizes. By thus standardizing the production of die sets the use of jigs and fixtures in production has been made possible so the complete interchangeability for all parts can be obtained.

Combination Tool and Dump Truck

IN place of two trucks as usually employed for making emergency street repairs, one to carry the men and tools and the other the paving materials, a special vehicle which combines both functions has been developed by the engineers of the Public Works Department of the City of Detroit and the Wood Hydraulic Hoist & Body Co., in whose plant it was built.

Besides making for greater economy in operation through employing one vehicle instead of two, the special truck enables everything to arrive on the job at the same time so that the work can be handled faster. It also tends to reduce local street congestion.

The new truck was constructed at relatively little additional cost through extending the wheelbase of a standard heavy-duty truck chassis. As will be seen in the reproduced photograph, the dump body, cab for the men and compartment for the tools and equipment are carried on the same chassis. In the dump body there is an additional compartment for transporting canvas coverings, lanterns, barriers and signs.



Detroit's new emergency street repair truck with combination tool and dump body

VISCOUNT ROHAN has been elected chairman of the Sports Commission of the Automobile Club of France, succeeding the Chevalier Rene de Knyff, who occupied the post for about a quarter of a century. The Sports Committee of the Automobile Club of France has control over all automobile contests held in France

Greater Economy in Present Methods of Fabricating Silent Gears

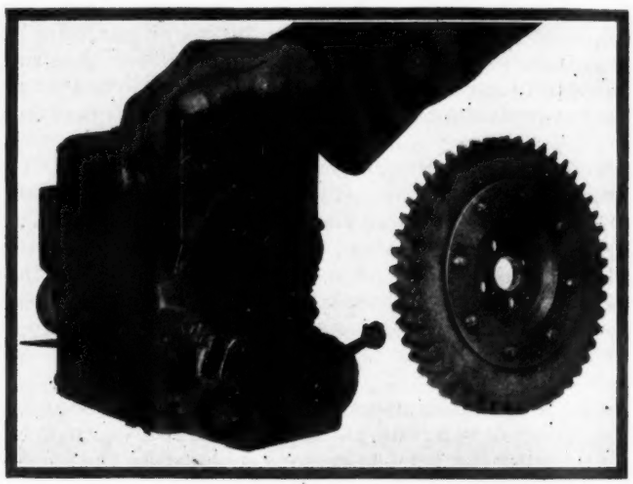
Waste is largely eliminated by cutting material into small segments and molding to form annulus. New development is pressed steel center. Centers of molded material also used.

By H. R. Moyer
Westinghouse Electric & Mfg. Co.

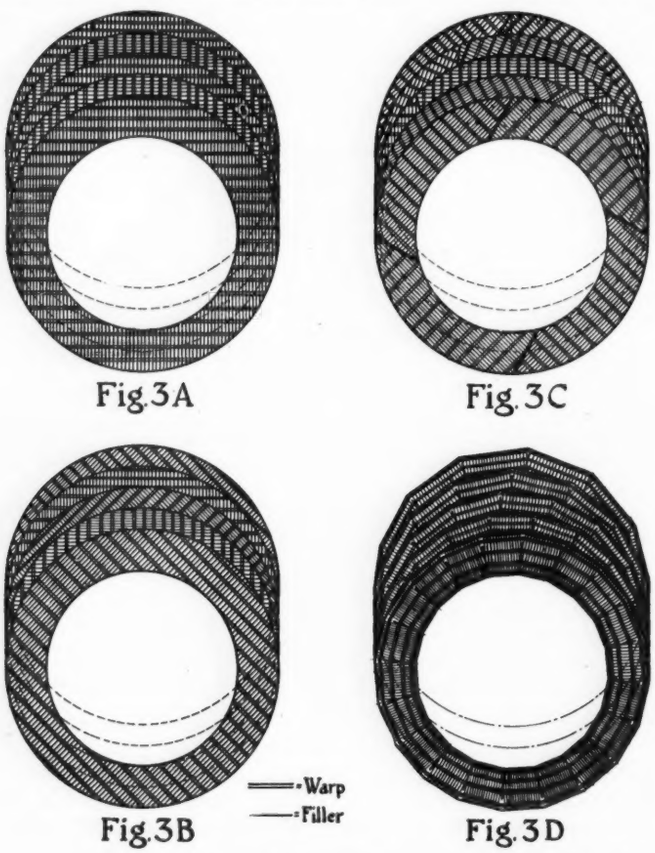
LAMINATED sheet material with an infusible synthetic resin binder was developed in this country just previous to 1911. It was originally developed and used for electrical insulation, but the year 1911 saw its first application as a gear material. It is significant that the first gears made of this material were distributor gears for the ignition system of an automobile engine, and Fig. 1 illustrates this first Micarta gear. Only a short time later Micarta was successfully applied also in the industrial field.

The original insulating material had a paper base, but it was soon found that canvas was better suited for gearing purposes.

Most timing gear trains consist of three gears, viz., the crankshaft, camshaft, and generator shaft gear, but two and four-gear trains are also used. In the two and three-gear trains, the best arrangement is to use the non-metallic material for the camshaft gear and in the four-gear train for the idler gear. The camshaft gear is the larger gear, being twice the diameter of the crankshaft and three times the diameter of the generator gear. There are less tooth contacts per revolution for each tooth of the camshaft gear than for the teeth of either of the other two gears, and this results in more uniform wearing conditions in the three gears. With but a few exceptions the use of non-metallic material for the camshaft gear is the standard practice of the manufacturers of automobile engines.



Left, Fig. 1. First gear made of Micarta, used as distributor gear. Right, Fig. 2. Molded Micarta gear bolted to metal center



Figs. 3A, 3B, 3C and 3D, showing different methods of building up stacks of canvas

Cut From Large Plates

Since Micarta was first produced in the form of large plates approximately 3 ft. square and varying in thickness from a fraction of an inch to several inches, the first gears naturally were made from blanks cut from this plate material. The rings cut from this plate were then bolted to cast iron centers or hubs as shown in Fig. 2. The gear shown in this figure is of one of the earlier designs.

In building up the treated cloth for plates, alternate sheets are crossed so that the warp and filler threads in adjacent sheets are at right angles to each other. Fig. 3-A shows the position of the threads (warp and filler) with respect to each other in the different layers.

that make up the plate or bank. Also, in this figure, the position of the threads in the different teeth around the circumference of the gear can be readily seen. In this as well as Fig. 3-B, 3-C, and 3-D, the double cross lines represent the warp threads and the single cross lines the filler threads. The warp threads are those running lengthwise and the filler those extending crosswise of the cloth. In these figures, it is attempted to show, by shifting four adjacent laminations, each relative to that next to it, the relative positions of the threads of the cloth in adjacent layers.

The next step in the development of the timing gear was prompted by reasons of both economy and uniformity of material. In cutting rings from plate material, the centers, of course, were left, and in many cases, because of size or quantity, they could not be utilized for any other purpose and hence were of no value.

Sawed or Punched Layers

The amount of material in these centers varied from slightly less to considerably more than that in the ring. Also, as was mentioned before, the arrangement of the threads in the different teeth would vary. Each tooth in an eighth of the circumference would have a slightly different arrangement of threads. In order, therefore, to improve these conditions, the next method devised was to mold rings from sawed or punched layers of the treated material, staggering the adjacent layers with respect to each other, giving the arrangement shown in Fig. 3-B.

With this method the centers still remained, but they were of the treated, uncured cloth which could be cut up into pieces suitable for other forms of molding. By staggering the layers in this manner, the arrangement of threads in all the teeth would be the same, although it would vary from layer to layer across the face of the gear. These molded rings, after being machined to size, were then bolted on to metal centers, as in the case of the blanks cut from plate. To mold these rings required individual molds consisting of matrix and pressure rings.

Shortly after starting the molding of rings, the idea was conceived of molding the material directly onto a knurled metal hub or center, thus eliminating the necessity of bolting on. Fig. 4 shows a knurled cast metal center such as used in this type of gear.

It can be readily seen that even with this molded ring

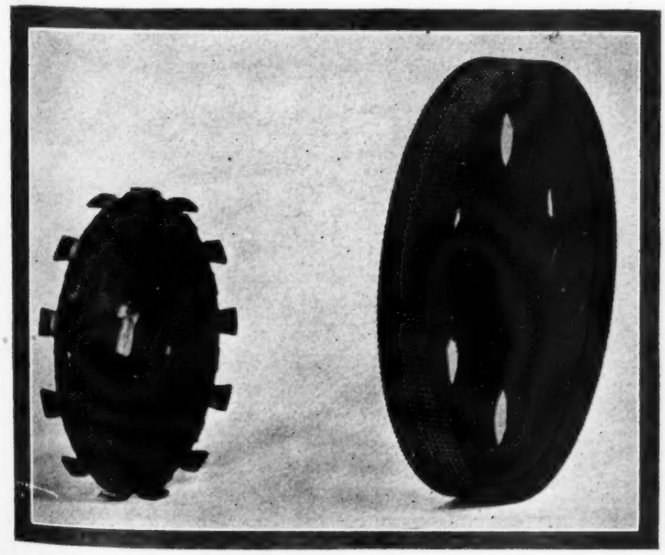


Fig. 4. Flexible pressed steel and knurled cast metal centers

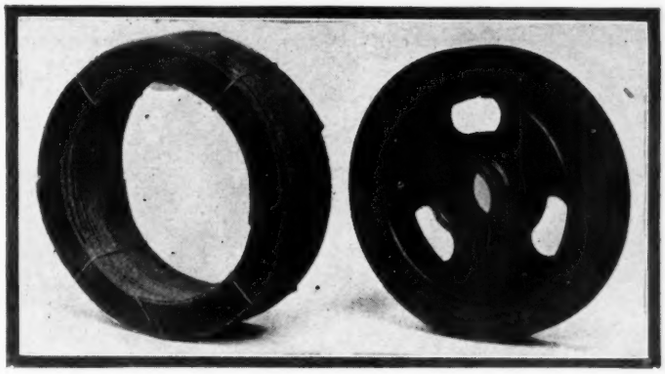


Fig. 5. Ring built up of segments and complete gear with metal center

form of construction, with large quantity production the amount of material left from the centers of these rings would be quite large, and economic disposal of it was somewhat of a problem, especially since at that time applications for molded comminuted material were not numerous. Therefore, another method was sought to still further reduce the scrap material (that is, insofar as its use in the molded blank or ring is concerned) and also, at the same time, get a still more uniform distribution of the threads or fibers in the ring.

This search led to the segment form of construction. With this method, segments of one fourth the circumference of the ring are punched and then laid together to form a complete ring. These segments are built up around a forming block until the required number of layers for the particular width of blank is obtained. The butted ends in adjacent layers are staggered so that there is always an overlapping of material at these points. Fig. 5 shows a stack of segments built up ready for the mold, and the final molded blank on a knurled cast metal center. It is obvious that the scrap in this case is considerably reduced compared to the methods previously employed. The arrangement of the threads in the ring for this form of construction is shown in Fig. 3-C. It will be noted that the warp threads in the center of the segments are radical, and deviate from the radical by a constantly increasing angle up to a maximum of 45 deg. at the edges of the segment.

Number of Small Segments

This segment form of construction was used until very recently, when a method was developed by which the annulus is formed by a number of segments about 1 inch in length. In the case of a 6-inch diameter blank this means eighteen to twenty segments, instead of four, as by the method previously described. The filler threads then are practically radical in all parts of the blank, as shown in Fig. 3-D. It will be noted that the butt ends are again staggered, so that the lapping over of these butted ends by the segment in the adjacent layer ties the whole into a well united mass.

In connection with this method, a number of test gears were made from blanks made in this manner but having the warp and filler threads run diagonally or at 45 deg. to the radical. The ends of both the warp and filler threads would then come out more nearly normal to the tooth profile. However, since these tests did not indicate any superior wearing properties in comparison with the radial arrangement, this diagonal scheme was abandoned.

Fig. 6 illustrates the four steps from the long strip of material to the molded blank. It will be observed that diamond shaped pieces are punched at short spac-

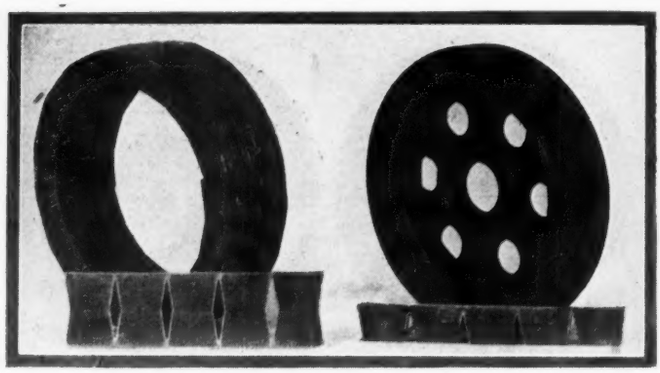


Fig. 6. Ring built up from notched strip and corresponding gear

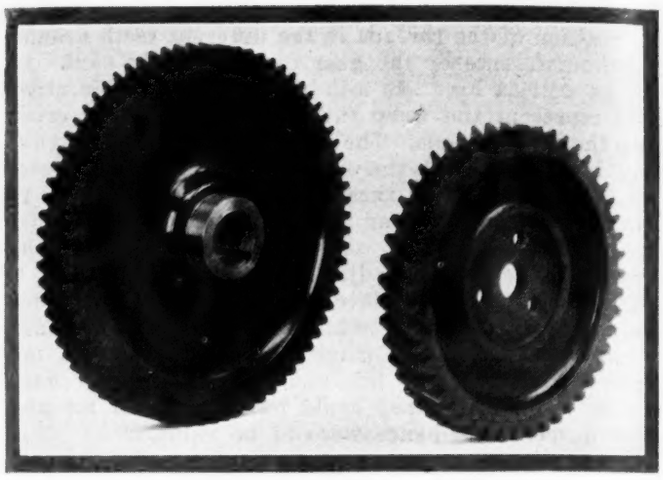


Fig. 7. Non-metallic gear with metal bushing for keying to shaft, and all-Micarta gear

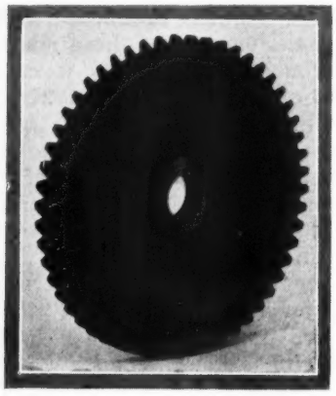


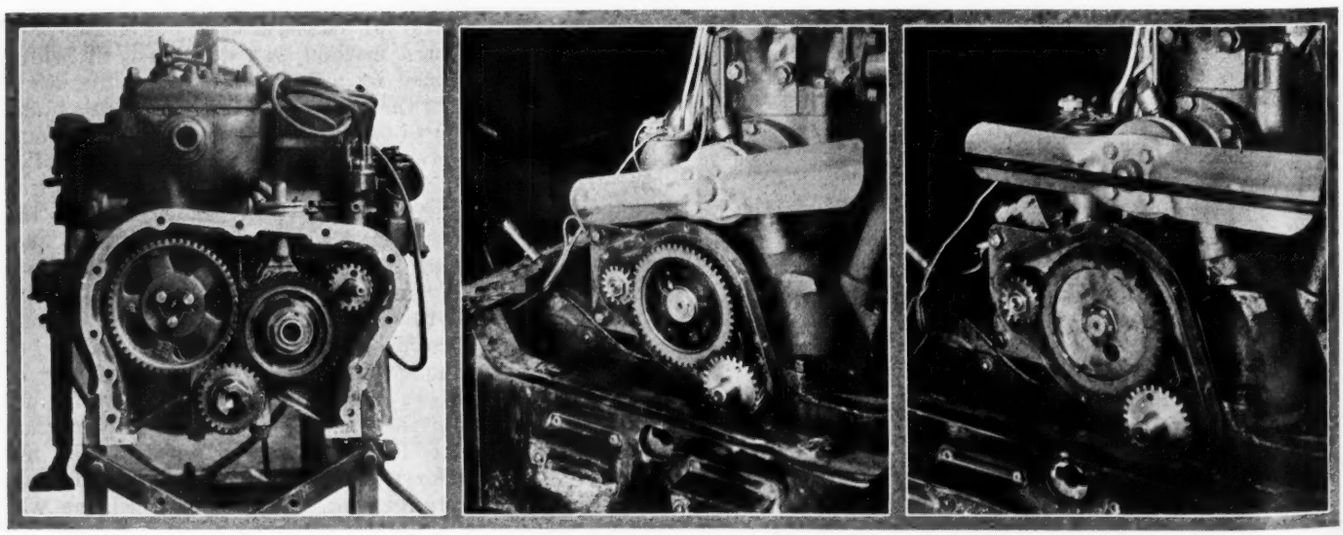
Fig. 8. Non-metallic gear with pressed metal center

ings from the strip of material which is then folded lengthwise in the center and wrapped on edge to form the stack ready for the mold. This figure also shows how well the adjacent layers lap over the butted ends, thus resulting in a compact mass when molded. All stacks are carefully inspected before molding to insure proper lapping over of the butted ends in adjacent layers. The few lengthwise threads at the apex of the notch of the folded strip may be mostly all machined off after molding, the purpose of this being only to serve as a means of holding the segments together until laid into place around the forming mandrel.

It can readily be seen that this construction produces a uniform distribution of the threads of the cloth throughout the whole rim, thus resulting in very uniform wearing conditions on all of the teeth. Finer weave cloth is also used, which requires slightly over 100 layers to form an inch of molded width. This gives a very smooth tooth surface and therefore better wearing quality. Aside from these advantages in quality, a considerable saving results from reduction of the waste material to a very small percentage, and this waste is in such a form that it can be used directly for other kinds of molding. A great number of actual service tests have indicated that very uniform wear throughout all the teeth of the gear is obtained with this rim structure.

Thus far, only the knurled metal-center type gear has been mentioned, and although this produces a very substantial gear, especially in respect to the gear mounting, yet a later type in which the body or web of the gear is also of molded material, has been taking first rank in trade demands. Fig. 7 shows gears of these two types, the one with a metal bushing for keying to the shaft, the other without any metal insert, and of the flange type, which bolts on to the shaft.

Gears of the "all Micarta" type sometimes operate a little more nearly silently when first installed, especially



Left, Fig. 9. Four-gear front-end-drive train with non-metallic idler. Center, Fig. 10. Three-gear front-end-drive train with Micarta camshaft gear. Right, Fig. 11. Three-gear front-end-drive train with thin pressed-steel web-type camshaft gear

if the gears are a little tight and require some "running in" to properly seat themselves. However, numerous tests have shown that after a proper "running in" gears of the cast-metal center type will become and remain as silent in operation as those of the "all Micarta" type.

The latest step in this line of development is the thin pressed-steel-center-type gear. Fig. 8 shows this pressed-metal center. This type embodies the advantages of both the cast-metal center and "all Micarta" types. The method of securing the molded rim to the metal web is worthy of special attention. It is obvious that with the construction shown in this figure there can be no loosening of the rim from the metal web. This thin pressed steel center, in conjunction with the latest form of rim construction just mentioned produces the best and most economical type of construction yet attained. It has several advantages over the other two types, in that it compares favorably in weight and degree of lateral flexibility with the "all Micarta" type, that in all cases a metal-to-metal gear mounting or seat is obtained, and that a positive anchorage of the Micarta rim to the metal web is assured.

Figs. 9, 10, and 11 show actual installations of camshaft gears of the three principal types. These are some of the test installations made by the manufacturer of these gears. Extensive service tests are always made on any new type of gear to get comparative test data and to definitely determine whether the gears will function satisfactorily under actual service conditions.

Fig. 9 shows a cast-metal center type, segment rim (3C) idler gear in a four-gear timing train.

Fig. 10 is an "all-Micarta" cam shaft gear in a three-gear train and Fig. 11 is the latest type of thin pressed-steel web-type cam shaft gear, also in a three-gear train. The rims of the gears in Figs. 10 and 11 are of the latest strip wound or multiple segment (3D) construction.

Dealer Problems and Policies Reflected by Survey

ASSUMING that automobile dealers in the St. Louis territory face about the same set of problems that confront other American dealers, and that their business methods and experiences are typical in character, some of the points brought out by a recent survey conducted by the St. Louis *Post-Dispatch* will probably be of value to manufacturers in showing in a general way conditions which obtain in dealer organizations throughout the country.

The results of the survey have been published in pamphlet form by the *Post-Dispatch*. Following is a summary of the important points covered:

1. What per cent of sales are made on deferred payment plan?

46% of dealers—80 to 100%
41% " " —50 to 79%
12% " " —less than 49%
1% " " —no data

2. What per cent of new sales carry a trade-in?

54% of dealers—80 to 100%
37% " " —50 to 79%
8% " " —less than 49%
1% " " —no data

3. What per cent of dealers operate service stations on flat rate basis?

77% do
14% do not
8% use both flat rate and time service
1% do not operate service station

4. What per cent of dealers operate used car department in same building as new cars?

78% do
22% do not

5. What is source of used cars on hand and in storage?

(a) Repossessions:
66% of dealers—none
32% " " —less than 5% of their sales
2% " " —no data

(b) Trade-ins for new cars:
72% of dealers—80 to 100%
25% " " —50 to 79%
3% " " —no data

(c) Trade-ins for used cars of higher price:
57% of dealers—less than 49%
34% " " —do not accept such trade-ins.
5% " " —50 to 79%
4% " " —no data

(d) Used cars bought by dealers:
93% of dealers—do not buy used cars
5% " " —buy less than 30% of their used cars
2% " " —no data

6. What is the average cost of selling a used car (per cent of selling price)?

56% of dealers—less than 19%
23% " " —20 to 35%
21% " " —no data

7. What is the average time required to market a used car?

62% of dealers—30 to 90 days
16% " " —no data
13% " " —12 days to four weeks
5% " " —up to 10 days
4% " " —more than 13 weeks

8. What terms are acceptable on used cars?

47% of dealers—40% down, balance in 10 months
34% " " —40% down, balance in 12 months
6% " " —33 1/3% down, balance in 10 months
5% " " —33 1/3% down, balance in 12 months
2% " " —50% down, balance in 10 to 12 months
6% " " —others, varying from 25% down with no definite time for balance to strictly cash.

9. What classes of buyers are chief source of sales for used cars?

53% of dealers—Skilled and semi-skilled labor, clerks, mechanics and salaried people in general.
36% " " —All classes
6% " " —Tradesmen
2% " " —Wealthy people (dealers handle high price cars)
2% " " —Used car dealers
1% " " —Farmers

10. What are the greatest obstacles to used car sales?

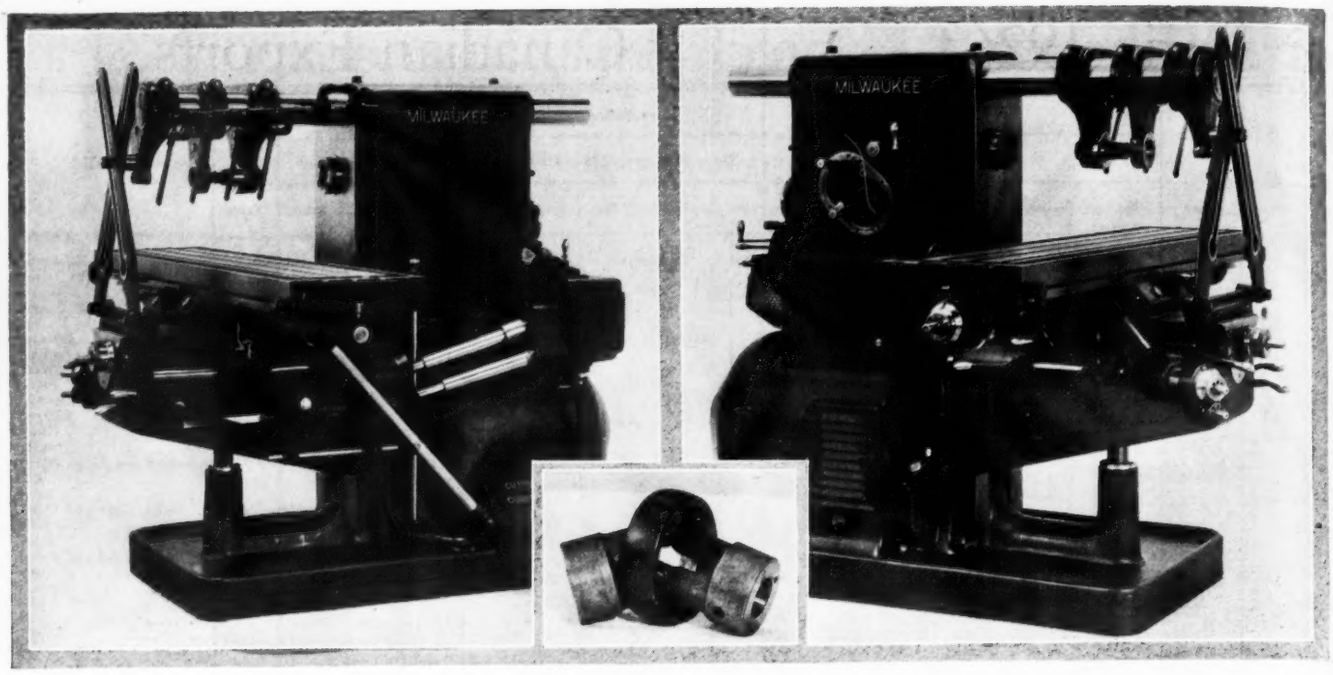
55% of dealers—Price (low new car price, excessive trade-in figure, and high down-payment demanded by finance companies)
36% " " —Saturated market
6% " " —Reckless and unscrupulous used car dealers
3% " " —Aversion of public to used cars.

U. S. Exports of Cars, Trucks, Tires and Parts

COUNTRIES	GASOLINE PASSENGER CARS										TRUCKS					
	Up to $500		$500 to $800		$800 to $1200		$1200 to $2000		Over $2000		Up to 1 ton		1 to 2½ Tons		Over 2½ Tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria	2	$645	3	$2,082	1	$927					1	$838	1	$1,023		
Azores and Madeira Islands	11	4,866	4	2,883	1	995					9	3,896			2	2,984
Belgium	432	185,207	163	133,938	559	619,921	75	$120,086	53	$137,539	624	228,861	2	1,108		
Bulgaria			4	3,036	3	2,811	1	1,503								
Czecho Slovakia			2	1,743	4	3,971	1	1,961	3	7,066						
Denmark	776	703,706	260	200,662	132	135,905	17	29,682	14	36,752	1,008	425,808	10	11,650	2	4,484
Esthonia																
Finland			55	41,327	93	99,521	52	79,242	7	18,495	10	11,809	15	22,626		
France			20	16,156	22	26,765	19	31,042	4	12,408	10	5,615				
Germany	2	922	131	92,219	44	44,913	12	18,781	47	120,405	194	66,261	2	2,466	2	3,997
Gibraltar																
Greece	1	500	3	2,055			4	5,837	1	5,700						
Hungary	4	2,008			4	4,425										
Iceland and Faroe Islands			2	1,486			1	1,382								
Italy	520	155,160			7	8,248	2	3,197	3	12,123						
Latvia			4	3,088	6	6,446	3	4,901								
Malta, Gozo and Cyprus	5	2,637	6	3,547	2	2,186										
Netherlands			58	43,077	111	119,777	41	64,188	19	50,778	1	542	18	27,051		
Norway	11	5,014	32	23,824	34	35,128	11	16,629			1	1,109	15	23,932	1	1,734
Poland and Danzig	1	400	1	627			1	1,686	1	3,400			1	3,000		
Portugal	29	14,056	45	34,370	17	19,138	6	9,003	2	5,000	10	5,634	2	2,052	1	4,323
Rumania			16	12,359	7	8,047	3	5,110	3	7,500						
Russia	6	2,638	1	869							8	4,663	1	1,060	4	23,230
Spain	297	94,215	131	102,173	88	93,202	44	69,299	31	89,563	273	102,745	20	20,114	17	44,192
Sweden	14	6,752	239	175,026	176	179,123	47	69,812	12	33,272	14	9,444	21	24,925		
Switzerland	4	2,316	20	37,328	108	123,135	33	50,971	26	65,486						
Turkey	23	11,404			1	1,014							22	11,660		
United Kingdom	15	6,743	225	142,864	178	189,892	79	132,334	23	69,329	1,275	600,530	266	339,502	13	16,943
Irish Free State	3	1,500	3	2,523	7	7,388										
Yugoslavia			10	7,083			1	1,332	1	2,500						
United States																
British Honduras	1	492														
Canada	304	94,711	1,363	800,601	817	791,140	138	207,028	66	185,954	68	80,507	196	263,667	38	107,373
Costa Rica			7	5,270	2	2,000	5	7,954			3	2,789	5	5,247		
Guatemala	4	1,998	8	6,074	9	9,068	7	9,542	5	14,230	15	9,162	11	15,417	1	4,200
Honduras	8	3,084	1	632							2	1,285	1	1,140		
Nicaragua			5	3,514	5	4,563	2	3,020			1	564	6	7,761		
Panama	25	11,959	10	7,023	18	21,901	2	2,873	1	2,500	12	6,059	1	842		
Salvador	3	1,080	28	19,990	4	4,080	3	4,382	5	12,500	9	4,968	14	30,210	5	19,967
Mexico	808	262,954	194	123,313	92	96,496	42	59,982	19	49,155	214	125,591	33	43,594	7	13,308
Miquelon			1	602												
Newfoundland	10	3,900	15	10,953	9	9,144					3	550				
Barbados	2	964	2	1,250	1	1,020										
Jamaica	43	16,783	19	12,780	15	14,321	1	1,500			27	9,762	1	2,268		
Trinidad and Tobago	6	2,868	1	800	4	3,915	1	1,348			4	2,821	3	3,604		
Other British West Indies	12	4,812	3	1,384	1	1,151	1	1,324			7	2,309				
Cuba	281	99,279	104	69,372	34	34,232	21	34,648	11	34,962	107	36,517	37	45,536	10	34,302
Dominican Republic	20	8,197	3	2,150	3	2,997			1	2,566	28	12,629	6	4,232		
Dutch West Indies	2	718	4	2,876	1	1,115	1	1,486			4	1,470				
French West Indies																
Haiti	18	6,762	14	10,705	14	14,117	2	2,995	2	5,000	34	13,805	9	14,252	1	4,200
Virgin Islands			1	754												
Argentina	283	134,130	663	464,291	251	262,093	72	112,874	50	141,111	388	148,045	26	29,028	17	60,420
Bolivia			1	879	8	8,675	3	4,295	3	7,729			5	8,443		
Brazil	575	223,041	337	241,987	193	208,038	62	89,888	30	73,723	124	45,527	38	43,138	3	8,512
Chile	212	47,796	87	26,923	18	18,361	7	10,959			24	8,478	20	24,491	15	55,416
Colombia	41	16,240	23	16,788	51	56,982	16	25,698	3	8,914	87	44,113	51	68,082	8	27,858
Ecuador					1	1,133					2	2,312	1	2,750	1	7,038
British Guiana			3	2,067												
French Guiana																
Dutch Guiana	2	882			1	1,190	1	2,098								
Paraguay					1	1,099										
Peru	77	30,646	22	15,307	58	58,878	8	11,772	8	20,875	70	26,329	46	57,019	1	4,800
Uruguay	651	190,131	64	44,752	47	49,127	10	16,094	5	15,392			56	20,025		
Venezuela	44	16,932	31	20,935	78	79,243	16	24,297	6	16,743	58	24,267	19	26,184	6	26,758
Aden																
British India	32	14,072	85	61,316	65	69,144	16	22,845	1	3,120	103	74,858	6	7,630		
Ceylon	13	6,110	56	42,184	48	51,737	8	12,043	1	2,567	28	22,580	18	23,970	8	10,712
Straits Settlements	41	18,710	52	39,177	16	17,382	1	1,966	3	7,500	2	1,192	17	23,668	3	7,995
Other British Indies																
China	44	17,006	37	27,171	36	37,929	5	6,851	1	2,728	47	25,111	6	6,246	1	660
Chosen																
Java and Madura	34	12,206	163	125,136	61	62,206	18	27,773	8	20,229	23	16,716	15	14,904		
Other Dutch East Indies	16	7,333	40	29,740	10	10,234	2	3,119	1	2,567			3	3,749		
Hejaz, Arabia and Iraq	16	5,840	12	9,461	4	5,186					8	5,896			2	5,076
Hongkong	17	6,360			4	3,993	2	2,703			5	2,220	1	1,151		
Japan	51	16,542	17	12,750	86	89,320	8	12,659	8	22,060	3	1,035	6	5,600		
Kwangtung	48	19,612	1	676	3	3,293	2	2,592								
Palestine and Syria	100	33,160	18	12,122	27	25,676	2	3,113			6	4,290			1	13,200
Persia	23	8,460									3	2,214			20	66,800
Philippine Islands	297	113,699	65	50,260	58	60,126	4	6,118	7	18,201	167	52,262	23	34,554		
Siam	13	6,060	4	2,912	2	2,232										
Turkey	10	4,961									2	1,067				
Other Asia																
Australia	1,246	499,412	1,004	668,426	1,226	1,321,979	67	107,358	64	171,259	1,139	551,971	82	126,404	40	102,864
New Zealand	136	65,340	151	97,273	225	269,209	11	18,273	2	5,395	31	19,243	28	39,565	4	7,157
British Oceania	2	866	2	1,810	2	2,160					2	618				
French Oceania	4	1,984														
Other Oceania																
Belgian Congo	3	1,188									10	3,520			6	19,812
British West Africa	15	6,811	3	1,875	5	4,740					40	39,654	18	28,099		
British South Africa	394	174,353	320	223,771	505	544,958	39	59,658	3	8,766	60	38,140	35	43,869		
British East Africa	53	22,460	27	19,768	10	11,083	4	7,102			28	18,792	3	3,979		
Canary Islands			4	2,894	9	9,576	3	4,375					8	8,028		
Egypt			11	7,748	4	4,806	1	2,032			20	7,040				
Algeria and Tunis	16	5,896														
Other French Africa	14	4,544	5	3,631							44	17,270	2	2,011		
Liberia																
Morocco			2	1,758	5	5,240										
Portuguese East Africa			1	754	6	7,140							1	1,804		
Other Portuguese Africa	6	2,760	13	9,934	4	2,411					11	5,286	32	30,974		
Spanish Africa			2	1,234									1	1,075		
Total	9,232	$3,456,793	6,527	$4,454,098	5,762	$6,110,717	1,067	$1,654,615	564	$1,533,062	6,511	$2,988,589	1,286	$1,616,379	240	$710,115

for April, 1926 | Canadian Exports

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
			Casings		Inners		Solids		Up to $500		$500 to $1000		Over $1000					
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		$2,681	432	$12,231	125	$496												Austria
		3,252	40	485	26	147												Azores and Madeira Islands
		549,470	5,402	54,158	5,201	9,155			1	$378	5	$4,719	5	$6,381			$21,273	Belgium
																		Bulgaria
		8,756	968	25,463	723	2,406	61	$2,755										Czecho Slovakia
		770,032	2,277	40,349	467	1,964	83	2,029					15	18,531			39,184	Denmark
		112																Esthonia
		18,673	1,079	27,825	665	2,395	36	1,575			12	7,985	5	5,279				Finland
		443,909	3,514	84,831	2,615	14,729	6	195										France
		143,479	2,430	81,323	1,604	6,999					5	4,677	2	2,552				Germany
		1,686																Gibraltar
		7,532	679	13,217	244	629	36	1,312										Greece
		754	194	3,356	221	623												Hungary
		325											1	1,210				Iceland and Faroe Islands
		184,631	197	4,215	211	731	4	187										Italy
		135	60	1,135			10	430										Latvia
		821							6	2,535					4	1,758		Malta, Gozo and Cyprus
		93,495	2,328	67,589	995	3,414					20	12,593	5	5,086				Netherlands
		13,683	1,646	31,959	505	1,535	51	2,243	1	381	17	12,204	4	4,930				Norway
		616	449	7,069	207	490												Poland and Danzig
		29,229	171	3,441	420	1,478												Portugal
		1,938	176	4,473	222	1,042			20	8,363								Rumania
		2,900	118	3,870	184	876												Russia
		144,301	5,711	116,175	4,158	14,319	182	7,933	10	4,408								Spain
		113,448	7,511	151,260	3,535	10,829	28	2,124			14	9,998					185	Sweden
		11,878	1,768	35,486	831	3,125												Switzerland
		6,581																Turkey
1	$1,281	497,657	14,967	287,599	12,356	26,813	1,571	54,523			61	57,854	80	101,515	1	2,040	22,606	United Kingdom
		21,535															1,021	Irish Free State
		1,362	199	4,918	12	80			2	742								Yugoslavia
									7	2,538							30,860	United States
		447	4	69											1	292	308	British Honduras
1	400	2,837,421	903	24,597	2,242	7,048	135	6,726										Canada
		3,364	6	241	97	534	26	623			3	2,548			5	2,207		Costa Rica
		19,169	194	4,030	273	1,011					1	679	6	7,286	4	1,755	30	Guatemala
		2,474	4	65			8	639										Honduras
		456	90	1,705	166	448												Nicaragua
		17,197	1,280	29,318	863	3,721	34	1,263			3	2,962	5	6,048				Panama
		7,821	276	7,449	419	1,991			8	3,316					4	1,755		Salvador
5	4,389	134,508	10,158	142,678	8,877	19,791	266	9,112										Mexico
																	406	Miquelon
		4,049	321	4,590	354	956					1	678					45	Newfoundland
		1,800	37	856	57	147			1	336	2	1,874	1	1,121				Barbados
		11,011	9	104	52	53			6	2,414	1	879			6	2,633	40	Jamaica
		6,071	22	682	29	141			3	1,138	2	1,526			12	4,391		Trinidad and Tobago
		3,437	33	609	87	232	32	1,112	3	1,268	1	912			5	1,532	31	Other British West Indies
		81,257	8,661	105,752	7,369	12,833	854	36,883			1	959	7	8,688			84	Cuba
		11,922	456	8,879	634	2,112	97	3,133										Dominican Republic
		3,125	82	1,441	150	417	4	79	1	378			1	1,315	3	1,333		Dutch West Indies
		409	44	711														French West Indies
		12,455	209	5,800	449	1,532	1	96	*5	2,012	1	678	1	1,204	4	1,756		Haiti
		832	12	138	24	50	1	50										Virgin Islands
		500,088	17,434	250,080	24,669	58,011	566	25,350	25	9,450	65	44,070	10	15,053			91,751	Argentina
		4,227							1	402	1	510	4	4,823	30	13,165		Bolivia
		456,934	5,618	58,829	3,100	4,433	552	10,933	25	9,450	42	32,686	10	12,297			39,293	Brazil
		76,763	720	16,840	375	1,229	55	4,691	9	3,863			5	6,442	8	3,512	2,019	Chile
		65,777	1,821	52,035	2,326	10,644	6	370	18	7,800	6	4,800	18	22,611	40	17,960	30	Colombia
		3,553	400	7,506	252	892	10	268					4	4,930	10	4,388		Ecuador
		1,007							18	6,024	3	2,098			2	584	81	British Guiana
																		French Guiana
		11	35	347	20	40	2	40										Dutch Guiana
		1,368																Paraguay
		52,106	1,113	33,749	1,284	5,748	78	3,350	2	863			1	1,249	16	7,300		Peru
		48,869	870	16,106	554	666	124	7,247	26	11,459	9	5,402	4	5,376	10	4,805	443	Uruguay
		55,141	1,843	42,414	1,504	5,489	98	1,890	31	12,442	9	6,941			64	26,084		Venezuela
		121	75	1,124	140	328			6	1,764					4	1,288	633	Aden
		79,806	773	20,077	282	1,201	144	7,637	432	158,915	34	24,755	5	6,518	293	104,295	37,165	British India
		17,466	235	5,155	118	545	154	7,854	65	23,534	6	4,368			66	19,791	6,188	Ceylon
		66,279	1,128	16,850	571	1,282	156	5,030	237	69,430	11	10,273			178	65,055	1,269	Straits Settlements
																		Other British East Indies
		29,766	1,608	26,927	1,151	3,282	22	1,025	16	6,910	6	5,506	8	12,568	4	1,806	127	China
																		Chosen
		56,005	2,525	48,859	1,066	3,429	208	9,825	228	86,169	50	39,550	3	3,846	256	73,919	8,923	Java and Madura
		15,244	205	3,972	190	578	5	157										Other Dutch East Indies
		3,904	602	11,430	558	2,851	174	7,510			1	931	3	3,832	4	1,760		Hejaz, Arabia and Iraq.
		2,346																Hongkong
		355,642	1,847	31,603	1,980	5,602	613	13,781	12	4,930	4	3,494	3	4,580	10	4,362	1,872	Japan
		3,814																Kwangtung
		13,920							11	4,534					4	1,756		Palestina and Syria
		2,956	566	19,208	979	4,935			2	805								Persia
		66,505	7,518	116,225	6,103	15,553	732	25,747										Philippine Islands
		1,912							12	3,736								Siam
		2,884																Turkey
			7	73	7	17												Other Asia
		350,561	7,629	178,763	3,365	11,338	1,240	66,477	90	23,172	105	61,086			110	33,163	913	Australia
		57,326	1,112	21,184	1,639	3,904	374	20,123	340	122,415	124	92,972			156	58,344	32,782	New Zealand
		1,033	42	567	26	71			5	1,952					1	472	848	British Oceania
		758	86	1,253	26	121	9	500										French Oceania
									8	2,818							3,711	Other Oceania
		10,010																Belgian Congo
		27,223	76	1,156	108	316			15	5,006	15	8,672			45	13,954	7,297	British West Africa
		116,390	2,138	35,796	1,076	3,202	120	3,832	67	26,997					23	8,936	3,217	British South Africa
		14,922	301	4,554	362	957			14	5,652	2	1,838			21	7,944	4,160	British East Africa
		4,885	314	6,747	290	880	113	6,667	3	1,325	2	1,493			6	2,639		Canary Islands
		23,938	915	15,686	1,450	3,774	101	4,405	3	1,143								Egypt
			50	849	30	88	6	263										Algeria and Tunis
		4,837	4	105	4	20			1	410								Other French Africa
		513	44	557	75	176												Liberia
		28,945							2	756					30	14,251		Morocco
		44	39	426	8	23												Portuguese East Africa
		6,210	9	274	16	70			2	732							927	Other Portuguese Africa
		653	24	616	42	103												Spanish Africa
7	$6,070	$8,866,758	134,843	$2,450,083	113,415	$309,090	9,178	$369,994	1,800	$645,065	645	$475,170	216	$275,271	1,440	$512,985	$359,722	Total



Left, Fig. 1. Right side of new Milwaukee No. 4 horizontal milling machine which is equipped with rapid traverse for all directions of work travel. Right, Fig. 2. Left side showing duplicate control levers, oil pump mounting and motor enclosure. Gear box is placed at rear of the column. Inset, Fig. 3. Close-up of unique self-lubricating universal joint

New Milling Machine Has Rapid Traverse for All Motions of Work Table

Milwaukee No. 4 line made in plain, universal and vertical types with normal table range of 42 x 14 x 20 in. Designed for electric drive but provision is also made for belt drive.

DESIGNED primarily for individual electric drive, the new Milwaukee No. 4 milling machine line made by the Kearney and Trecker Corp. has a number of advanced features. As in all recent Milwaukee machines, the double overarm is a feature of the horizontal machines. Hardened gears are used throughout the gear train from the motor to the spindle and the first three or high speed gears have ground teeth. Timken taper roller bearings carry all shafts up to the spindle, which is mounted in adjustable tapered bronze bushings.

An entirely new feature is the application of rapid traverse to all three motions of the work table. By means of control levers mounted on the front of the table which control a multiple disk friction clutch, the table can be traversed at 150 in. per min. in either direction, the saddle can be moved in or out at 70 in. per min, and the knee can be raised or lowered at a rate of 50 in. per min. These high speeds have proved particularly advantageous in setting up work.

Made in Three Types

The new No. 4 line is made in plain, universal and vertical types with a normal table range of 42 x 14 x 20 in. although a standard long table increases the first figure to 52 in. Standard feed ranges from ⅝ in. to 25 in. per min. in 18 steps which are obtained by the ten-gear train similar to that found in earlier models made by the same company. The feed box which is located conveniently on the back of the column now is of new design which incorporates a conventional sliding gear transmission. Upon order, a special high and low feed attachment may be applied to the feed box. With this attachment the number of feeds is increased to 36 with a range of from 3/16 in. to 40 in. per min.

As shown in Fig. 1, the individual electric motor is enclosed in an enlarged section at the base of the column which is cast integrally with the base of the machine. This arrangement places the commutator and brushes at the rear end of the compartment which is closed by a hinged door. A screened opening in this door and ventilating louvres in another door at the side of the column provide adequate circulation of air through the motor compartment. Also this arrangement of the motor brings the pinion and idler gear within the main column of the machine where they are subject to the flood type lubrication which is supplied to all parts within the column.

Contrary to former practice, the manufacturer has given electric drive first consideration in the design of this machine and expects to deliver at least 90 per cent of production so equipped. For the minority demand, a special coverplate which supplants the door at the back of the column carries an outboard bearing in which a drive pulley shaft is mounted.

In conjunction with the flood oiling system which has

characterized Milwaukee millers for several years, the oil pump mounting and piping has been simplified. As shown in Fig. 2 at the position just in front of the louvred door near the bottom of the column, a cover plate contains the intake and outlet passages of the pump which is mounted integrally at right angles on the inside of the same plate. This arrangement permits removal of the pump with disturbance of any of the connections in the oil line which conveys oil from the compartment in the base to the highest point in the machine from whence it floods all bearings and gears.

Automatic Lubrication

Practically all parts of the machine are lubricated automatically by three provisions which are built into the construction. These are as follows: Flood lubrication, covered by the previous paragraph, for all gears and bearings in the column and feed box; splash lubrication for all rapidly moving parts in the knee; oil reservoirs equipped with wicks for table and saddle parts and bearings.

The cutter coolant pump is located at the right side of the column at the rear of the reservoir marked "Cutting Compound." Drive is obtained by the vertical shaft shown and a clutch which may be disengaged when the machine is working on cast iron. By means of the piping shown, about 8 gal. per min. of coolant can be delivered to any arrangement of cutters at the spindle arbor. Like the lubricating pump, this unit can be removed without disturbing any connections in the coolant line. Return of the coolant from the heavy table which is machined all over is made by a telescopic jointed pipe shown in Fig. 1.

An unusual mechanical feature is the design of the self-oiling universal joints which transmit power to the knee and table. As shown by Fig. 3, the usual construction has been reversed and the ring is much larger than either yoke member of the joint. In this case the ring construction consists of two pieces, an inner bronze driving member which is surrounded by a tight fitting steel shell which forms an annular oil compartment. In each application the outer yokes which are adjacent to either the gear box or the knee are drilled to form oil passages which lead through one of the pins and therefore communicate with the annular reservoir. Oil pockets maintain a head of oil back of these yokes and therefore insure a constant supply. The centrifugal action of the rings insures lubrication to all universal joint bearing surfaces.

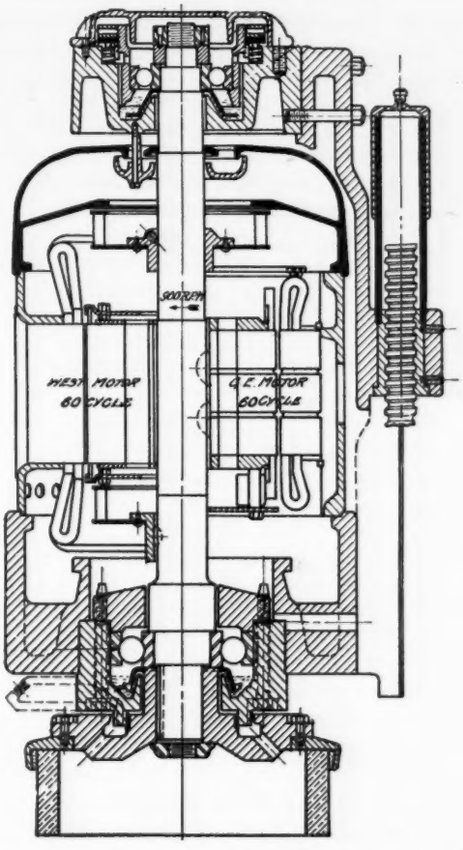
Levers for controlling the table, cross feed and vertical feed which are located on the front of the knee are duplicated at the left rear of the table. Similarly, duplicate main clutch control levers are provided. These duplications facilitate control, as the operator is in full control of the machine when standing at either the front or side of the machine, which is intended primarily for large production work. Both the main clutch and rapid traverse clutch are multiple disk consisting of alternate saw steel and bronze plates running in oil.

In addition to the double overarm and triangular pendants, these machines include other Milwaukee features, such as spindle reverse, solid top knee and flanged spindle nose. A new table lock for boring operations is furnished. Weights range from 10,800 lb. for the plain machine to 12,400 lb. for the universal type.

Surface Grinder Improved

THE wheel head of the direct-motor-drive type of No. 16 Blanchard vertical surface grinder now has its spindle carried on two large ball bearings in the sliding wheel head. The upper bearing is held up by springs which take up all end play and place a considerable thrust load in an upward direction on the lower or main bearing at all times. The design is the same as that which for several years past has been successfully used in the Blanchard automatic surface grinder.

The older type of spindle, now used on the belt-driven machines only, had the spring-take-up feature but used four bearings, two thrust and one radial ball bearings, and a bronze bushing. With the new head no bearing adjustment is required, there is no maintenance expense on the bearings, and the oil consumption is very small.



Section through new ball-bearing wheel head of Blanchard No. 16 surface grinder

The wheel guard is held directly in the head, eliminating the spider casting formerly required and the water passage in the head is easier to clean. A sectional view of the new head is shown herewith.

AN association recently formed by American colleges and universities giving cooperative instruction in engineering, commerce, architecture and other subjects will hold its first annual meeting June 14 and 15 at the University of Cincinnati where the cooperative system was originated 20 years ago.

Under the cooperative plan the students spend alternate periods at the university and at work in industry. The theory learned in the class room is thus applied in industry and the problems which arise in industry are brought to the classroom. Some 15 colleges and universities have adopted the cooperative plan and a large number of well-known industrial companies are employing these cooperative students in their plants.

The students benefit by the opportunity to study technical problems at first hand and by access to the best modern equipment. The industry benefits by the enthusiasm and the analytical point of view brought into their organizations by the student employees.

Books for the Business Bookshelf

Twenty Automotive Giants

Automotive Giants of America. B. C. Forbes and O. D. Foster. B. C. Forbes Publishing Co., New York. 295 pp. $2.00.

IT seems there were twenty giants. They weren't always giants; not by a long shot. But now they are giants—giants stalking through the automotive industry. But they aren't bad giants like the ogres that eat up little children. My, no. These are good, kindly giants, many of whom have made their way up from very pigmy-like beginnings and who now spend their time building automobiles to increase the happiness both of little children and grown-ups. B. C. Forbes and O. D. Foster are the brave men who have picked out those who are to be called giants and in this volume have told in regulation formula style the brief life history, the "How-I-Became-a-Success," and the chief personal attributes as seen from the outside of each of twenty leading executives in the automotive industry.

As a reference work the book is quite valuable, as literature it is trite and stereotyped but good of its kind, and as entertainment rather pleasant if taken in small doses but pretty much of a bore if the collection of articles be read one after the other.

The book contains a particularly interesting tabulation showing birthplace, age in 1926, first job, and education of each of the executives discussed. Summarizing this set of facts, Mr. Forbes says: "Every one of them is self-made. Most of them had only a modern amount of schooling. Nine had some college training. Few of them started life in any mechanical or engineering line of work. Not one of the twenty comes from the Far West. The East and Middle West gave birth to most of them, although the South can claim three."

The men written about are Harry Bassett, Roy D. Chapin, Walter P. Chrysler, W. C. Durant, A. R. Erskine, Harvey S. Firestone, Henry Ford, Charles D. Hastings, F. J. Haynes, John Hertz, E. S. Jordan, C. F. Kettering, Alvan Macauley, C. S. Mott, Charles W. Nash, R. E. Olds, Alfred P. Sloan, Jr., H. H. Timken, Walter C. White, John N. Willys.

A Real Letter Writing Help

Applied Business Correspondence. Herbert Watson. A. W. Shaw Co., Chicago. 599 pp. Illus. $6.

A BOOK on business letter writing which contains no list of words and phrases which should not be used in letters and which pays no particular attention to the effects of participal closures, poor grammar and other *bete noirs* of letter experts may be considered unique. And this book is unique in more ways than these. As far as is known, this book is the first published attempt to treat a letter as a complete problem which can be solved by the application of certain easily understood principles. To each of these principles a chapter is devoted, not only in its explanation but in showing its practical application through the use of innumerable illustrations from all sorts of letters.

The eight principles upon which Mr. Watson bases all letter construction are:

Sizing up the work the letter must do or the "load" it must carry.

Expressing in words the "big idea" or the feeling which the writer wishes to convey.

Overcoming indifference or opposition.

Making the meaning of the letter clear.

Convincing the reader of the writer's sincerity.

Adding persuasiveness to the letter.

Getting action.

Gripping attention.

Each one of these items is explained so clearly and so logically that, as the book is finished, the reader has, instead of a mass of detail suggestions, a well developed plan for attacking any letter-writing problem. And after the ideas and ways of presenting them are determined Mr. Watson believes that the words and grammar used are of secondary importance.

Anticipating Business Movements

Forecasting, Planning and Budgeting in Business Management. Percival White. McGraw-Hill Book Co., New York. 267 pp. Illus. $2.50.

THERE appear to be many authors who are ready and willing to explain the mechanics of forecasting business conditions but very few who display the same eagerness in telling their readers how to apply these statistical mechanisms to the solution of actual problems. The present book is neither better nor worse in this respect than several other volumes on the same subject. It contains information concerning the various items of interest to the prospective forecaster such as the business cycle, index numbers, methods of obtaining data upon which to base forecasts, the use of graphics, etc.

Then, with but a very sketchy exposition of how these mechanisms may be used in making a prediction, the author continues with the task of applying the predictions to operations through the use of budgets, planning departments and similar means. Insofar as it goes the book is clear, concise and reasonably authoritative. It is to be regretted, however, that the method of making actual forecasts has been given so little attention. This is by far the most difficult part of operation planning yet it has received much less attention by writers than any other phase of the subject.

The Tractor as a Trail Breaker

Pagasus or Problems of Transportation. Col. J. F. C. Fuller. E. P. Dutton & Co., New York. 87 pp. $1.

AS an available means for developing territories such as exist in the British Empire the author of this interesting little book brings forward the value of tractors of the chain tread type which can be operated in the absence of roads. The development of the railroad is given considerable attention but then the author calls attention to the fact that railroads are only as valuable as are the facilities for reaching them from the surrounding territory through which they pass.

Construction of roads for this purpose, especially in sparsely settled places, is very costly and Col. Fuller suggests that tractors might well be used in order to hasten the development of such localities.

EDITORIAL

Can Hoover Help Again?

MOTOR coach, body and parts manufacturers are going to urge adoption by all States of a set of uniform specifications for bus design regulations. At a recent meeting in Detroit under the auspices of the National Automobile Chamber of Commerce, a group of manufacturers agreed tentatively on a set of specifications to be recommended.

Even when final agreement among the manufacturers is reached, the task of getting the various States to concur will be a large one. Some of the provisions would necessitate alteration of State laws, although many of them involve only changes in regulations made by State motor vehicle commissioners.

The shortest road to achievement of such uniform action on the part of States may be through the machinery which Herbert Hoover has set up in the Department of Commerce for simplification and elimination of waste in industry. Not only bus makers and State officials, but electric and steam railway men, bus operators and others have an interest in such a question. Working through a disinterested agency such as the Department of Commerce, actual progress might be considerably quicker than through direct contact of agencies whose interests, in some respects at least, are not identical.

Starting Resistance of Engines

A RESULT that at first sight seems rather perplexing has been arrived at in tests at the Bureau of Standards on the relation of the viscosity of oils and the torque required to start engines from cold. It was found that the torque required to turn over the engine at speeds of 100 r.p.m. and more varies appreciably with the viscosity of the oil, but that the latter has no appreciable influence on the actual starting torque or "breaking loose" torque.

A superficial consideration of the subject would lead to the conclusion that the starting torque should be more or less proportional to the viscosity of the oil, as when an engine is started from rest it does not carry any load and there is therefore no intense pressure upon any of its bearing surfaces. In fact, the chief resistance to the motion of the bearing surfaces over each other would seem to be the resistance to shear of the oil film, that is, the viscosity of the oil.

The explanation of the phenomenon probably is that during a period of rest the oil film is largely squeezed out from between the bearing surfaces and the working parts therefore are in metallic contact. This probably applies more to the shaft bearings than to the contact surface between the piston and the cylinder wall, because when the engine is at rest the unit pressure between piston and cylinder wall is exceedingly light. It is the existence of metallic contact, or at least of a great reduction in the thickness of the oil film during periods of rest, that explains the fact that the breaking loose resistance is higher than the resistance to motion thereafter.

New Jersey's Traffic Ruling

IN one State at least, a traffic control mechanism which only a few years ago was hailed by many as a panacea for highway congestion has passed. The New Jersey State Highway Commission has decided that automatic traffic signals are an obstruction to vehicular movement and has ruled such devices off the State highways.

The Commission's objections are based upon circumstances familiar to every motorist. The cycle of light changes in automatic signals is based, usually after insufficient study, upon average conditions at the crossing, if but one intersection is controlled, or upon conditions at the busiest corner if several intersections are controlled from a single station. In the first instance average conditions are seldom identical with actual, and in the second case a cycle suitable for the busiest corner is rarely satisfactory for the minor crossings under synchronous control with it.

In either case vehicles are continually being held up by "Stop" signals when there is no cross traffic to interfere with their progress. These few seconds of unnecessary delay, repeated at frequent intervals, often results in a closely packed mass of cars whose drivers are exasperated with the unnecessary hold-ups, are anxious to put on speed and, in so doing, become prevalent sources of accidents.

The New Jersey Commission contemplates using police at all intersections where the amount of traffic warrants control. While this method may be practicable in rural districts where important intersections are relatively few it would be much too costly for use in outlying parts of cities and would but add to the present confusion if adopted in congested regions.

In congested districts, traffic conditions at any corner are too closely related with the control exercised at adjacent corners to permit consideration of each intersection as an individual problem without regard for what is done at the others. Just how such traffic may be handled most effectively is uncertain now. It is reasonably sure that some solution of the problem must be found—and soon—if city dwellers and visitors are to continue as sales prospects for motor vehicles. As mentioned on this page a short time ago, the experiments with wave movements of traffic being carried on in the Chicago Loop district and in Washington may offer a solution. The results obtained from them so far have been very satisfactory.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, June 3, 1926

May Retail Sales Movement Holds Close to April Volume

NEW YORK, June 3—Sales of motor cars are falling off slowly in some sections of the country, while in others they continue to expand or hold stationary. Generally speaking, the northernmost states are showing increases, while in the south, where the sales peak would naturally be expected to come earlier, the trend is downward after probably the best seasonal sales on record.

On the whole, despite somewhat cooler weather than the trade would like to have seen, May was an exceptionally good month, well ahead of the same period a year ago. As a result of the strong market, accumulations of new cars were virtually wiped out in many of the leading lines.

While production has been gradually declining, it is not without the bounds of possibility that it will be stepped up again this month. Retail sales have been running well ahead of factory output for many weeks, and in the absence of any pronounced slump in deliveries in the next three weeks, some of the more favorably placed factories may be able to open the throttle slightly.

While conditions are thus satisfactory from the manufacturing standpoint, the year to date has piled up grief for the dealer. Used car stocks are at or above the highest points in the history of the trade in most sections of the country. The better class of dealers are devoting their efforts to the cleaning up of these stocks while the market for cars is still good, but the task is at best onerous, for nearly all the new car sales involve trade-ins and under the current conditions of intense competition it is difficult indeed for the dealer to make only a fair allowance on the trade.

Undoubtedly the high level of new car sales this year could not have been maintained had dealers exercised the proper prudence in their trading, but soon or late conditions will be such that they will have to mend their ways, and this is the period that is being watched for.

(Continued on page 949)

Edsel Ford Returns

NEW YORK, June 2—Returning from Europe with Mrs. Ford yesterday, Edsel B. Ford said that the Ford Motor Co. sold approximately 200,000 automobiles and 35,000 tractors in Europe last year. About 18,000 of the tractors were purchased by Russia, where Mr. Ford says the natural evolution of the automobile business is first with the tractor, then the truck and then the passenger car. He also expects that tractor demand will increase greatly in France. Mr. Ford spent five weeks in England, France and Italy.

N.A.C.C. Head Urges Care in Time Sales

Conservatism Needed With Credit Easy—May Production Near April Level

NEW YORK, June 3—Although advance figures were not available at the annual members' meeting of the National Automobile Chamber of Commerce today, May production of passenger cars and trucks in the United States and Canada is believed to have run slightly under April, which was the high record month. Colonel Charles Clifton urged the necessity of observing conservatism in financing new and used car sales. With money and credit easy, he advised a careful study of the buyer's credit and emphasized the desirability of one-third down and 12 months to pay, as a sound minimum instalment basis.

The report of the recent advertising managers' conference in Detroit was accepted, and the members recommended that advertising based upon "fear" or mention of competitors' names without their consent be avoided. By fear advertising is meant the attempt to expand car sales by emphasizing safety devices in a manner which reflects upon cars which do not possess such devices.

All officers were re-elected and these directors whose terms expired were again chosen: Alfred H. Swayne, Colonel Charles Clifton, Windsor T. White, F. J. Haynes and Harry M. Jewett. At the motor truck meeting this afternoon, A. J. Brosseau, of Mack Trucks, discussed the investigation of motor vehicle common carriers recently announced by the Interstate Commerce Commission. The conclusions reached by the bus convention in Detroit, May 6, were reported with recommendations as to standards for regulations. Recent surveys into the use of trucks in the industry and the action of the New York Automobile Underwriters' Conference on reduced rates for motor truck insurance were discussed.

FIRST SIX MONTHS BEST EVER—WILLYS

TOLEDO, June 1—Despite talk in some financial centers of a slump for the motor industry in the fall John N. Willys, president of Willys-Overland Co., declares that prosperity will continue and that good times are ahead this year.

"My own observations of conditions show a healthy situation," he said, "and I look for continued normal development.

"Retail buying this spring has been of record-breaking proportions notwithstanding all pessimistic forecasts. When financial reports of the leading companies are in for the first six months of the year they will probably reveal the most prosperous period in the history of the industry."

Mr. Willys said May sales and earnings for Overland were breaking all records. He intimated that the first half of the year would show net earnings of $7,000,000 to $8,000,000.

Steel Body Propaganda Rouses Lumber Trade

WASHINGTON, June 3—Charge that "certain automobile body manufacturers" are disseminating propaganda against the use of wooden bodies, is made here this week by Wilson Compton, manager of the National Lumber Manufacturers Association. The point made by the association is that the "propaganda is an insidious attack on lumber," and is also unfair to body makers who use wood instead of steel.

In an effort to combat the attack on lumber the association is mailing out copies of the prepared feature page which they declare is being mailed to all newspapers, containing such headlines as "Automobile Industry Heeds Trend of Progress. Wood Forced Out by Steel in the March of Progress," pointing out that wooden bodies are no longer safe and urging that only steel bodies be used.

Highway Bill Deferred

WASHINGTON, June 3—Consideration of the $165,000,000 Federal aid highway bill, which has been on the calendar of the Senate since May 5, was again sidetracked this week by a filibuster against the migratory bird bill.

Opposition to the measure by Senator Reed, of Pennsylvania, was directed against the large amounts which may be allotted to Western states under the Federal aid plan. Ultimately, passage of the measure is certain.

S.A.E. Head Predicts Compact Motor Near

Superchargers Also Probability Declares Litle, Opening Annual Summer Meeting

FRENCH LICK, IND., June 3—Passenger cars with small compact motors, probably equipped with superchargers, were predicted for the American market in the near future by T. J. Litle, Jr., president of the Society of Automotive Engineers, at the opening session here of the summer meeting. Nearly 800 members and guests were in attendance. An unusually large percentage of those at the meeting were full members of the society, associate members and guests being in the minority.

In addition to hearing Mr. Litle's prophecy about the coming of smaller cars, the 200 who attended the general session heard C. F. Kettering, president of General Motors Research Corp., tell the engineers that when they found a problem impossible to solve it wasn't because the problem was too hard, but because they were too soft.

All of the standards recommendations submitted to the standards committee were passed with the exception of the Army and Navy section, lighting plant ratings and incandescent lamp specifications. These three were withdrawn. A supplementary report of the tire and rim division was presented.

At the session devoted to discussion of riding qualities on Wednesday morning, W. C. Keyes pointed out how riding comfort can be bettered through improvements in seat cushion springs. At the same session, R. W. Brown exhibited a wide variety of improved apparatus which he has developed for making riding quality tests.

The proposal which has been made to the council to add to the list of officers of the society a vice-president of operation and maintenance was withdrawn by its proposer, J. F. Winchester. A committee to go over the entire constitution of the society has been recommended by the council and the constitution committee. It is understood that a plan which will leave the vice-presidencies as they are now, but incorporate society committees on operating production, design, etc., similar to the research committee and the standards committee already in existence, may be the basis upon which the new committee will begin its work.

Hupp Six Months' Business Shows 54 Per Cent Gain

DETROIT, June 1—From Nov. 1, 1925, to April 30, 1926, Hupp Motor Car Corp. has shipped 21,751 new Hupmobile sixes. This, it is claimed, sets another new high mark for the introductory sale of a new motor car.

O. C. Hutchinson, general sales manager, predicts that the success the Hupmobile six and eight are meeting, will make 1926 the largest in the company's history.

Shipments for the six months since the announcement of the new six were 54 per cent larger than those for the corresponding half-year in 1924-25, and were two-thirds those for the entire 1925 year. March was the company's biggest month in history, both in production and dollar volume of sales. May production may surpass March as the list of unfilled orders May 1 aggregated $6,000,000.

Wayne Assets Exceed Debts by $3,664,507

DETROIT, June 2—The balance sheet of Wayne Body Corp., successor of the Gotfredson Corp., under date of May 1 shows total assets of $7,230,056.16 and liabilities of $3,565,548.66, leaving net worth of $3,664,507.50. The corporate title was changed from Gotfredson Corp. to the Wayne Body Corp. under date of May 4, 1926. On May 1, 1926, the properties pertaining more particularly to the truck business were conveyed to a new corporation known as the Gotfredson Truck Corp., of which all of the shares, other than a few qualifying shares owned by Benjamin Gotfredson and M. H. Coleman, were issued to and are owned by the Wayne Body Corp.

The liabilities of the company include $1,500.000 in notes payable to banks, and $532,660.26 in notes payable to the trade. Accounts payable total $1,088,778 and accrued payrolls total $91,762. Land contracts payable total $220,995 and there is a reserve for Federal taxes of $79,586. Current assets include notes and accounts receivable of $768,291 and inventories of $1,457,641. Other assets include securities of Gotfredson Corp., Ltd., $285,-621, securities Gotfredson Truck Corp. $2,097,424, personal accounts $231,997, land $541,544 and buildings, machinery, etc., $1,690,723.

Benjamin Gotfredson, principal stockholder of Wayne Body Corp., is personal endorser of approximately $1,500,000 of bank paper.

O. S. Currier of Fisher Body Corp., has been selected by the creditor committee as general manager of the Wayne properties.

Bus-Truck Study in Fall

WASHINGTON, June 3—Investigation by the Interstate Commerce Commission, of motor buses' and motor trucks' competition with railroads, ordered last week, will not be begun until this fall, it was announced here this week by Secretary George B. McGinty. The taking of testimony, it was stated, will probably be held in New York, Chicago, Detroit, San Francisco and Dallas.

Fisher Votes G.M.C. Sale

NEW YORK, June 3—Fisher Body Corp. stockholders at a special meeting here today voted to dissolve the corporation and to sell the assets to the General Motors Corp.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

THE CREDIT SITUATION

NEW YORK, June 3—Trade continued to be adversely affected last week by the backwardness of the season. The textiles in particular have suffered from the late spring, mill operations being further slowed down during the past week in New England and in the southern states. In the wholesale and jobbing trades there is still a persistance of an extremely conservative purchasing policy.

On the other hand, the building industry continues at a high rate of activity despite the recent decline in building permits. The National Lumber Manufacturers' Association states that lumber orders, shipments and production in the week ended May 22 reached a high record for the year and were in excess of any week in May, 1925. While stock prices advanced during the week, the level of wholesale commodity prices showed a slight decline.

CAR LOADINGS

Car loadings reached the million mark for the first time this year in the week ended May 15. The total of 1,030,162 compares with 996,527 in the preceding week and 983,034 in the corresponding week a year ago. The total number of loadings since the first of the year shows an increase of 1.8 per cent over 1925 and of 5.4 per cent over 1924.

Production of crude petroleum decreased during the week ended May 22, the average daily output being 1,987,300 barrels, as compared with 1,999,000 a week earlier and 2,314,750 a year ago.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 152.6 last week, as against 152.9 in the preceding week and 150.2 four weeks earlier.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended May 26 were 3.9 per cent below the total for the preceding week but 4.1 per cent above that for the corresponding week a year ago.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks decreased $7,100,-000 during the week ended May 26, the increase of $12,300,000 in open market purchases being more than offset by the decline of $3,600,000 in the holdings of Government obligations and the decrease of $15,900,000 in discounts. Note circulation rose $7,600,-000, while deposits declined $37,500,-000 and reserves decreased $1,500,000. The reserve ratio declined from 76.0 to 75.4 per cent.

Call loan rates ranged from 3½ to 4½ per cent last week, as against 3¾ to 4½ per cent in the preceding week. The range of rates on time loans continued at 4 to 4¼ per cent.

Industry's Inquiries Cheer Steel Trade

Steady Flow of Orders Keeps Automotive Consumption on Sound Footing

NEW YORK, June 3—With the approach of summer, thought in the steel market centers on just how far activity will dip during the seasonally dull period of 1926. Opinion generally inclines to the belief that current demand plus what little there is in the way of backlog of orders will support operations at not much under three-fifths of capacity. The leading interest is generally credited with a present operating rate of four-fifths of capacity while the independents are said to be running at only 75 per cent of capacity.

With all the fault-finding on the score of automotive demand, alloy steel makers, finishing mills, strip and automobile sheet specialists enjoy a steady flow of orders, light as the tonnage involved in each may be, placing automotive consumption of steel on a relatively better footing than that enjoyed by the general run of steel products. Automotive inquiries for July shipment are decidedly encouraging to sheet-rollers and strip-steel mills.

What was "played up" a few days ago in the financial news as "an advance in steel prices," can hardly be considered as such—except perhaps in Wall Street for whose clientele it was obviously intended. When the market for steel bars weakened a few weeks ago and some sellers cut the going 2c price to the extent of $2 a ton, the leading interest did not permit any worthwhile business to get away and, when it was necessary, met the 1.90c price. There was, however, no announcement of any price reduction.

The 1.90c price of the independents brought no more business to them than they could have had at 2c, and, as is quite frequently the case in the steel market, when producers sensed that price-concessions failed to add to the irreducible quota of demand, a reaction set in. Perhaps the leading interest's reaffirmation of the 2-cent bar price has served to crystallize the sentiment among steel producers that for the time being price concessions have lost their effectiveness as a means of quickening demand, but certain it is that it cannot be looked upon as "an advance in steel prices."

Pig Iron—While actual buying of pig iron by automotive foundries has not broadened, somewhat more interest is being taken by melters in their late summer requirements and blast furnace interests have received quite a few tentative inquiries for July and August shipments.

Aluminum—While the price situation continues virtually pegged at the domestic producer's quotation, slightly greater abundance in offerings by importers, resellers and brokers is noted. Demand for remelted metal is good at unchanged price levels.

Copper—An interesting feature of the estimated copper consumption in 1925 by the American Bureau of Metal Statistics is that it places automotive consumption in 1925 at 212,800,000 lb. compared with the estimate of 225,000,000 lb. by the National Automobile Chamber of Commerce. The latter's estimate for 1924 was 107,471,000 lb. while the Bureau of Metal Statistics placed it at 187,400,000 lb. The market continues quiet and easy.

Tin—End-of-May statistics reflect orderly conditions in the supply. The market is a shade more animated.

Lead—Broadening of demand and a firmer tone are noted.

Zinc—Routine demand and steady prices prevail.

Oil Industry Needs Free Moving Prices

WASHINGTON, June 3—Charles Evans Hughes, counsel for the American Petroleum Institute, announces here that while the United States does not face an imminent shortage of oil, present production and reserves must be supplemented by continuous discoveries to insure an adequate supply. He dealt with the situation in detail this week in a lengthy address before the Federal Oil Conservation Board, which was created by President Coolidge and is conducting an inquiry to direct attention to the need for methods of conserving the nation's oil resources.

"We are on the eve," Mr. Hughes stated, "of important improvements in methods of production, in recovery of oil still below the surface within known fields, in utilizing what is produced, in promoting efficiency and in the development of substitutes. The great service this board can render is to bring about an intelligent conception by the public of the facts relating to the industry, of its problems, both economic and legal, and to foster the scientific investigations upon which ultimately the conservation of our vastly important resources must depend."

Mr. Hughes concluded by reminding that the key to finding the reserves "must be freely moving prices to induce men and capital to take risks."

Wisconsin Tire Plants Busy

MILWAUKEE, June 1—Tire plants in the Milwaukee sector not only have been able to refrain from curtailing output, but actually look forward to increased production as the touring and vacation season comes at hand. The Federal division of Fisk, at Cudahy, suburb of Milwaukee, is making 12,000 casings a day, or from 25 to 30 per cent more than a year ago, while plant additions costing $350,000 or more are under way. Ajax at Racine and the Racine Horseshoe plant at Racine are operating at from 75 to 80 per cent of full capacity, which is better than a year ago.

Excise Tax Payments Increase $25,600,000

Michigan Factories Pay Approximately $19,000,000—Wisconsin Makes Gain

WASHINGTON, June 3—Out of $98,199,079.22 in Internal Revenue receipts from "automobiles and motorcycles" during the first ten months of the fiscal year 1926, the state of Michigan contributed $72,139,057.46 as compared with $54,935,725.39 paid by Michigan during the first ten months of the 1925 fiscal year out of a total of $72,608,173.45, the Treasury Department announces.

Ohio ranks second to Michigan in this type of receipts for the first ten months of the 1926 fiscal year with $7,210,320.77 and Indiana third with $6,585,147.65. The statistics reveal that Wisconsin, by standing fourth, approximately doubled the receipts this State paid during the first ten months of the 1925 fiscal year, paying $5,317,165.75 in the 1926 period as compared with $2,627,399.51 in the 1925 period.

The total receipts from "automobile trucks and wagons" for the first ten months of the 1926 fiscal year were $6,565,174.58 of which Ohio and New York furnished $2,670,166.93 and $1,399,167.81, respectively. The total from this class in the first ten months of 1925 was $6,160,429.76.

Ohio holds its lead of 1925 in the $18,074,281.89 collections from "tires, parts or accessories" for the first ten months of the 1926 fiscal year, accounting for $5,935,082.47 of this sum as compared with $5,986,788.72 which this State paid during the 1925 fiscal period.

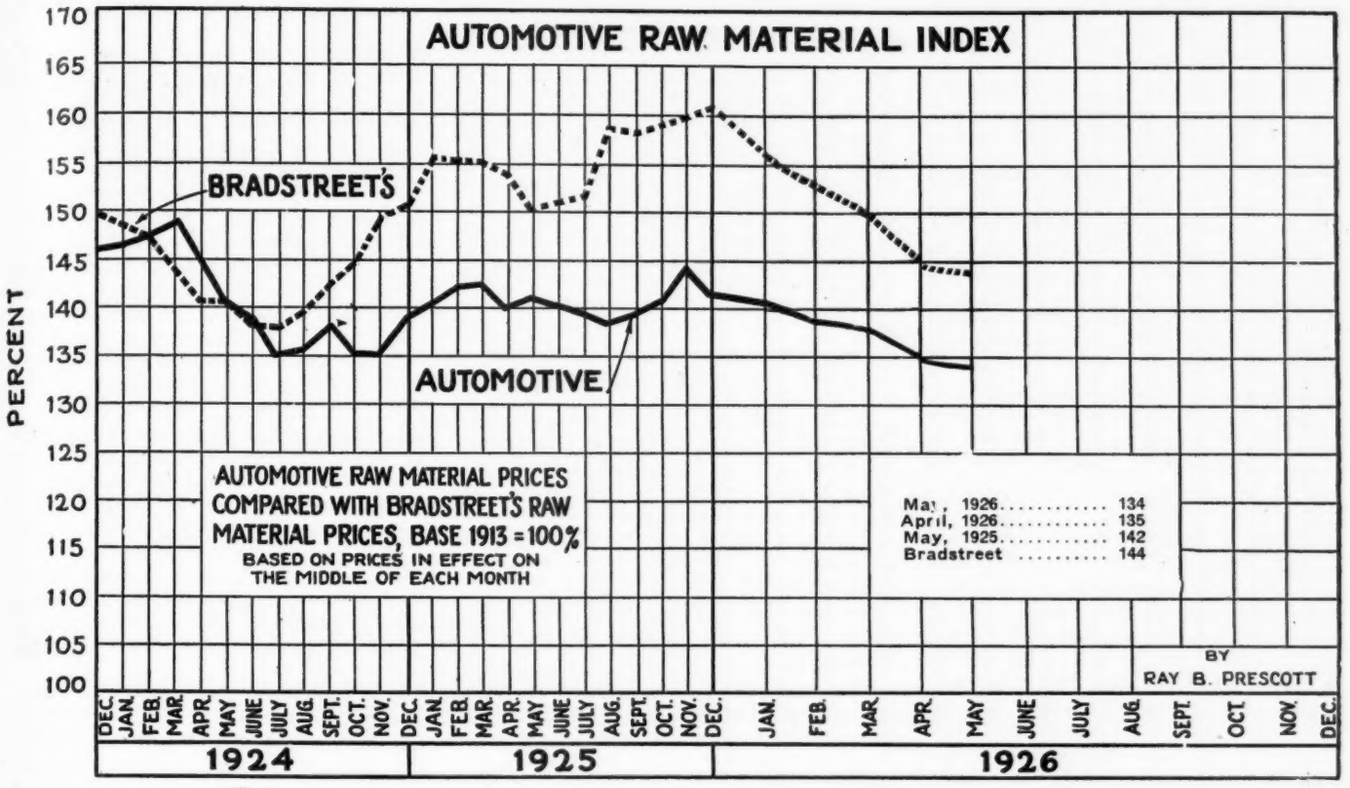
Tractor Business Active

MILWAUKEE, June 1—The situation of power farm machinery manufacturers at this time is revealed in a most encouraging light by a survey of principal shops in southeastern Wisconsin. At Milwaukee, the International Harvester Co., tractor and gas engine works are employing 4000 men, or 25 per cent more than a year ago. Business at the beginning of June is fully as active as in April and May, which represents a substantial increase over last year. The J. I. Case Threshing Machine Co. at Racine is experiencing a considerably better demand than at any time in three to four years and is employing upwards of 3000 men. Prospects are reported so favorable that operations at the present peak are expected to continue until the time arrives for laying out the production program for 1927 business.

Toledo Employment Steady

TOLEDO, June 1—Employment in Toledo automotive plants reversed the tendency of the last three weeks and made a gain during the closing week of May. There are now 29,974 workers employed as against 28,944 last year.

May Raw Material Index Falls One Point



N.A.D.A. Aids Hanch in Time Sales Curb

ST. LOUIS, June 1—Acting upon the suggestion made last week by C. C. Hanch, secretary and general manager of the National Association of Finance Companies, C. A. Vane, general manager of the National Automobile Dealers Association, has issued a bulletin urging local dealer associations to establish close cooperative relations with local finance associations to curb arising used car difficulties due to repossession sales.

"The National Automobile Dealers Association and the National Association of Finance Companies are maintaining the closest relations," the bulletin says. "In a way we can suggest developments and policies, but the actual field contact between the local dealer associations and the local finance repersentatives is the only way to insure that those recommendations are carried out."

So far as finance company competition with dealer used car departments is concerned, the bulletin continues, "a word may well be said for the finance company. And we will say it:

"As Mr. Hanch points out, low down-payments are the father and long terms the mother of repossessions. If dealers deliver automobiles on less than standard terms and those cars are finally thrown back on the finance company, dealers cannot expect the finance company to eat them.

"As we said at Chicago in January, all automobiles have to be sold at retail at least once. They're not sold when they're delivered on terms so loose that the buyer has only a renter's interest and not an owner's. So if dealers are staging a car registration competition at the expense of safe credit, and neglect to sell the car in the first place, they can expect to see it sold as a repossessed car by someone, somewhere."

Tractor Shipments Increase, Canada Largest Purchaser

WASHINGTON, June 3—Shipments of wheel tractors during April last were considerably greater than in April, 1925, and amounted to 5504 at a value of $3,093,707, as against 4303, valued at $2,278,647 in April, last year, it is announced by the Agricultural Implements Division of the Department of Commerce. The outstanding feature of the exports of tractors was the cessation of large shipments to Russia as only 214 tractors valued at $103,188 were exported to that country in April. The largest purchaser of wheel tractors in April was Canada which took 1196 valued at $949,668.

Devise Monoxide Alarm

WASHINGTON, June 3—A carbon monoxide recorder and alarm devised by chemists of the Pittsburgh experimental station of the Bureau of Mines, Department of Commerce, it is announced here, will doubtlessly result in making the movement of heavy automobile traffic through tunnels measurably safer. Detailed descriptions of these devices are given in Technical Paper 355, "A Carbon Monoxide Recorder and Alarm," by S. H. Katz, D. A. Reynolds, H. W. Frevert and J. J. Bloomfield.

Canada Will Refund $1,690,000 to Dealers

OTTAWA, ONT., June 1—A vote of $1,690,000 "required for the remission of excise tax paid on automobiles remaining in the hands of dealers unsold at the time when such tax was repealed by order-in-council of Dec. 18, 1920," passed the House of Commons in committee of supply. Hon. George Boivin, Minister of Customs, told the House that the average loss to each automobile dealer had been $833.33 on 7503 cars. It was in the nature of a compassionate allowance and the amount was large enough to include interest accumulated.

The dealers had a claim of equity and justice, although not in law and the minister said he would welcome opinion as to whether or not interest should be paid. Right Hon. Arthur Meighen, Conservative leader, said he was aware that there was much merit in the claim for remission when an excise tax which had been paid was removed. He could see no reason why interest should be denied and regretted that some earlier solution had not been possible.

Take Montevideo Franchise

SYRACUSE, May 29—The Franklin franchise of Montevideo, Uruguay, has been purchased by Hugh Diaz & Co. from Fresnedo & Co. The former Franklin dealers, Messrs. Madalena and Fresnedo, will give their exclusive attention to development of Franklin interests in Argentine and will have headquarters in Buenos Aires.

G.M.C. Makes Plans for New Flint Move

Sloan Tells Business Group of Development — Raskob Defends Time Sales

FLINT, June 1—The Buick Motor Co. will increase its production schedule July 1 and the General Motors Corp. is planning still greater developments here of a different nature, Alfred P. Sloan, Jr., president of the corporation, told 1000 Flint business men who tendered General Motors Corp. an appreciation dinner here tonight.

The announcement practically affirms a rumor persistent here for some time that General Motors is planning to give Flint a new industry. Definite announcement on the nature of the corporation's plans will be made soon.

General Motors is today in the third stage of its development, Mr. Sloan said. The first was the conception of the idea, second, development and third, coordination or the present stage. He paid tribute to the work of W. C. Durant in the earlier days of the corporation and then outlined the work General Motors is undertaking today.

Harry H. Bassett, president of the Buick Motor Co., reiterated Mr. Sloan's announcement, declaring to his fellow townsmen: "You have had a veiled promise made to you which ought to satisfy you for the present—I believe we have a wonderful growth ahead of us."

John J. Raskob, vice-president of the corporation and chairman of the finance committee, vigorously defended the installment plan of merchandising motor cars.

After reviewing how 75 per cent of all cars sold are marketed on the installment plan, Mr. Raskob said it is a live topic of conversation not because the installment business has grown but because people have awakened to the extent to which it has grown. While it is capable of abuse, it is no sign that it should be abused, he said, and to curtail the installment plan would, in his belief, result in a panic.

As an example he cited the experience of General Motors Acceptance Corporation, sixteenth largest banking institution in the country. In handling over a billion dollars in credit it has lost less than one-seventh of one per cent. "That is a record I dare say is unparalleled by any banking institution in the United States."

Other corporation executives present were: C. S. Mott, John L. Pratt, L. R. Beardslee, Charles T. Fisher, Donaldson Brown, Fred J. Fisher and Arthur G. Bishop.

Manufacturers and U. of M. to Cooperate on Research

ANN ARBOR, MICH., May 29—To bring about closer cooperation between industry and the University of Michigan in research work, manufacturers of Michigan, at a luncheon here, appointed a special committee to work with the university in strengthening their mutual relations. Albert H. Goss of Ann Arbor, was named chairman of the committee, and C. E. Bement of Lansing, vice-chairman.

"Research is only the process of trying to find out now what you are going to know in a couple of years," Charles F. Kettering, president of the General Motors Research Corp., declared in an address on "Research in Industry."

"Research is only another form of economics. Economics is at the foundation of all research, for before it is attempted the question first should be answered, 'does it pay?'

Despite the absence of Col. J. G. Vincent, of the Packard Motor Car Co., the report of his committee on automotive research at the university was presented. In the report he asserted that while competition requires that the great bulk of industrial research be done by individual firms, there still are many problems, the solution of which would benefit all and which thus can be handled well by some such outside research department as at the university.

YOSEMITE RUN WINNERS SET HIGH MARKS

LOS ANGELES, June 1—Winners in each of the classes in the tenth annual Los Angeles-Yosemite Valley economy run are officially announced as Class 1, Star "4"; Class 2, Star "6"; Class 3, Flint coach; Class 4, Franklin sedan; Class 5, Duesenberg touring; Closed Car, Stutz sedan; Sweepstakes, Duesenberg. The race distance was 360 miles. Official records of each of the participants as announced by J. A. C. Waters, run manager for the American Automobile Association, are as follows:

Class	Car	Weight	Gasoline	Oil	Water	Miles Per Gal.	T. M.	SW'S
Class 1-A	Star "4" Tour....	3050 lb	12.375	0.0	10.0	29.09	44.36	43.56
	Star "4" Coach....	3110 lb	14.375	1.0	1.0	25.04	38.94	38.18
Class 2-A	Star "6" Tour....	3200 lb	15.250	2.0	0.0	23.60	37.77	36.46
	Pontiac Coach	3330 lb	16.125	2.0	2.0	22.32	37.17	35.81
Class 3-A	Flint Coach	3660 lb	14.125	4.0	1.0	25.48	46.64	43.74
Class 4-A	Franklin Sedan....	4520 lb	18.000	1.0	0.0	20.00	45.20	44.64
	Packard Sedan ...	5110 lb	20.875	2.0	12.0	17.24	44.06	42.53
Class 5-A	Duesenberg Tour..	5110 lb	18.125	0.0	4.0	19.86	50.75	50.53
	Stutz Sedan	5570 lb	21.500	0.0	1.0	16.74	46.63	46.59
	Gardner Sedan ...	4750 lb	20.250	2.0	3.0	17.77	42.22	41.08
	Lincoln Sedan	6330 lb	35.750	0.0	1.0	10.07	32.03	31.99

Ton miles per gallon: Miles (360) times weight divided by gasoline in gallons.
Sweepstakes: Ton miles less 10 points for each pint of oil and 1 point for each pint of water, divided by gallons of gasoline.
Closed car championship: Figured on same basis as for general sweepstakes, as above.

Ricardo Patent Suit Will Start on June 7

Waukesha Action Names Cleveland Automobile in Case Now Opening

CLEVELAND, June 3—The suit of the Waukesha Motor Co. against the Cleveland Automobile Co. for alleged violation of the Ricardo Head patent is scheduled for trial before Judge Westenhaver in the United States District Court here June 7.

The patent in question is numbered 1,474,003 and was granted Nov. 13, 1923, to H. R. Ricardo and assigned to the Waukesha company. Brown, Boettcher and Diener of Chicago are counsel for the plaintiffs, and Fish, Richardson and Neave of Boston for the defendants. The suit is expected to attract more interest from automotive manufacturers than any tried in recent years.

The suit was filed in January, 1925, and the intervening period has been spent in the gathering and classification of all data with respect to cylinder head design.

The Ricardo patent covers a special combustion chamber shaped for L-head engines in which the roof of the combustion chamber approximately parallels the top of the piston with small clearance for a distance of about half way across the cylinder. It then domes over the valves providing a chamber that approaches the hemi-spherical in shape.

The advantages of this shape are stated to be that it provides a compact combustion chamber so that the maximum distance the flame has to travel from the spark plug is exceptionally small thus reducing the tendency to detonate. Moreover, the shape is such that it produces additional turbulence during the compression stroke which speeds up the process of combustion by the mechanical distribution of flame. In addition, a scouring effect is claimed which washes away the stagnant layers of gas adhering to the cylinder walls.

Inasmuch as a number of important manufacturers are using combustion chamber shapes which are in some respects similar to that employed by Cleveland, the present suit is of considerable significance.

Italy Plans Speed Highway

WASHINGTON, June 2—Details of a movement, initiated in Italy, for a city-to-city speedway, have been forwarded to the U. S. Department of Commerce. Briefly the plan is for the construction of speedway reserved for high-speed cars, which will pay a toll for the privilege of operating over the road with an average speed limit of 35 to 40 miles an hour. Ultimately the scheme is expected to embrace all Europe, under the management of the society incorporated in Italy. In Germany the plan is being supported by the German Road Construction Union.

May Retail Sales Close to April Volume

(Continued from page 944)

In trucks and buses the state of business is more satisfactory, for manufacturers and dealers are serving a genuinely expanding market, in which replacements do not nearly approach the proportion they have reached in the passenger car end of the industry.

Exports of automotive products are showing the normal seasonal gain, and the level is well above that of the same period a year ago.

Credit terms in automobile instalment selling are almost everywhere on a sounder basis than they were six or eight months ago, and this is a favorable factor of major importance.

Following are reports on retail conditions in leading centers:

BOSTON

Continued good weather has kept the sale of motor cars extending upward this month until a number of them have closed up the gap in the figures comparing the sales for the first few months of this year to the same period of a year ago.

Used cars have been going very well, and the prices have held up on them much better than the dealers had expected. The tire sales have not been as steady as a year ago, but with warm weather the dealers expect an end to the fluctuation period.

NEW YORK

Although new car sales in the Metropolitan territory during the first two weeks in May ran only 189 behind the same period in April the total for the month was not expected to reach the record figure of 17,795 sold in the previous month.

Used car market reports vary. The used car manager of one distributor reported continuous movement of units, but at a slower pace than in April, this being balanced by demand for used cars of better quality and higher price. Another reported only six used cars on hand and a strong demand for more with May business considerably above April.

PHILADELPHIA

May was a prosperous month for car distributors and dealers in this territory. All report big business, and it is asserted that May registrations will exceed those of April. Registrations for April this year were 5219 compared with 4103 a year ago.

The market for new cars has been so good that the used car business has been neglected and stocks are piling up. Dealers' stocks of new cars are considered fair.

ATLANTA

New car sales during May showed a substantial gain over last year, particularly low and medium priced cars, higher priced cars only slightly better. Business was also much larger compared with April than is usually the case, but this was due to the fact that the late spring delayed April buying considerably the early part of the month. Distributors look for active sales during June all over the territory.

The used car situation is unchanged. Dealers and distributors have comparatively large used car stocks in hand, but nothing abnormal. Used cars are selling on a little better basis than in April, and are also better than last year at this time. Stocks continue to accumulate, however, as a large majority of the new car sales involve trade-ins.

NEW ORLEANS

A survey of automobile sales in this territory for May indicates a drop of slightly over 9 per cent as compared with the preceding month, but shows an increase of approximately 11 per cent over May of last year.

The used car departments of the various dealers are uniformly in better shape than this time last year. This is due to the policy of conservatism of all dealers in trade-in allowances. In ratio of sales practically all dealers have fewer used cars on hand than in May, 1925.

DETROIT

Several large distributors here, near the end of the month, predicted that a complete check-up for May would show new sales records established, while others were of the opinion that the month's sales would see records closely approached.

The chief worry of many local automobile dealers is the used car problem. Trading has been unusually brisk and the volume of turn-ins has exceeded used car sales with a result that many companies find their garages and lots filled to capacity.

SEATTLE

With almost no exceptions, sales are running far ahead of 1925 for the first half of 1926 month by month. A typical example of the sales situation is that of a firm retailing a car here from $1400 to $2000. It reports sales 58 per cent ahead of last year while the distributors for the entire district are 42 per cent ahead.

Another pleasing angle is the good credit situation. Down payments are very satisfactory and evidence that people are buying more expensive cars than a year ago is found in the larger number of small cars being turned in.

PITTSBURGH

An expansion of sales of new cars over April was evident in the Pittsburgh and Western Pennsylvania market during May, but sales are generally reported to have been better than May of last year.

The used car situation is reported to be much better during the month.

Tire and accessory business is also improved, particularly the latter.

ST. LOUIS

Automobile sales during May were better than those of the corresponding month of last year with the greater part of the demand being for closed cars of the medium priced class. Dealers stocks are sufficient to care for immediate needs but there are no unwieldy stocks on hand.

Used cars are selling better than for several months past and stocks are about normal for this season of the year. Accessory sales are good.

CHICAGO

Retail sales demand has continued through May the pace set in April, dealers and distributors in nearly all lines and price classes report. Stocks are being reduced steadily although inventories are considered by some companies greater than the same time last year. Sales of cars generally show a big gain over May last year and a steady increase over April this year.

DENVER

The report of the Denver Automobile Dealers' Association for the four months period ending April 30, shows the effect of the first of the year slump. Conditions started to improve about February first, and have been on the up grade ever since, with a very good April and a better May. However, for the four months period above stated Denver showed a decrease in new car sales over the corresponding period of 1925, of seven hundred cars.

LOS ANGELES

There is a slight increase in new car sales for southern California in May over April and appreciable increase over May last year, low priced cars especially moving well. Pronounced tendency to liquidate used cars and keep stocks within reasonable bounds is undoubtedly cutting down new car volume. The situation is generally regarded as decidedly favorable with marked absence of any wild trading or market forcing. Profitable volume emphasized more this season than for years. Used car stocks are reasonably low.

Peerless Adds Taxi and 2 Sport Models

CLEVELAND, June 1—A de luxe type taxicab of distinctive appearance, and two new body models, a coupe-roadster at $1565, and a close-coupled 4-door sport sedan, listing at $1795, have been added to the light six "6-80" chassis by the Peerless Motor Car Co.

On account of the low appearance, color scheme and attachments, the coupe-roadster is regarded as the most striking in the Peerless line which now comprises 28 body models. It is finished in two-tone ocean-blue, silk mohair upholstery to match, with the folding rumble-seat in brown leather. The close-coupled sedan is finished in solid color blue, with the fenders and trunk lacquered to match. In the rear quarters, Landau bows and oval windows are provided, while the interior is upholstered in blue silk mohair.

Complete bumpers, nickeled headlights and cowl lights, and wide range of additional equipment is included in the price.

Several unusual features are incorporated in the taxicab which is to be sold in competition with other vehicles of its kind. It is provided with a landau folding top, leather upholstery and safety glass partition. A pilot light on the instrument board indicates to the driver when the door latches are unfastened in the passenger's compartment, while a buzzer is provided so that the fares can call the attention of the driver. The color scheme is cream above the belt, with orange below. There is also a complete range of lights for various purposes.

Burd Ring Company Expands

MICHIGAN CITY, IND., June 1—Expansion of facilities of the Burd Ring Co., manufacturing Burd-Gilman shock absorbers, has been found imperative and authority has been granted to erect a new building and equip it at a total cost of $100,000. This will permit a 50 per cent increase in production. The Burd High Compression Ring Co., of Rockford, Ill., started the manufacture of shock absorbers in that city two and a half years ago, having secured control of the George P. Gilman patents. Production at that time was but 50 to 100 sets per day. Now with the main plant here, the company turns out 4000 sets per day.

Bus Companies Seek Order Granting Operating Rights

WASHINGTON, June 3—Orders requiring the Public Utilities Commission of Maryland to grant them permits to operate on a regular schedule within the state of Maryland are sought in a suit filed in Baltimore this week by the Red Star Line, Inc., and the Washington Motor Coach Co. Judge Eli Frank signed an order in each case requiring cause to be shown June 5 why the permits should not be granted.

The companies now carry passengers to Baltimore and Harrisburg, Pa., and from Washington to Baltimore, Wilmington and Philadelphia. They may not carry passengers, however, between points within Maryland such as Baltimore and Laurel, although on the way to Washington the buses from Baltimore pass through Laurel.

Ohio Tax Nets $12,000,000

COLUMBUS, June 1—The two-cent gasoline tax in Ohio produced approximately $12,000,000 or $1,000,000 per month for the first year it was in force, according to a recent statement of the Ohio Tax Commission. The net receipts up to April 18, which is the end of the year were $11,945,346.54. This is approximately what the tax was expected to produce and that amount will go towards road construction and maintenance. Total net receipts from the tax during the month of April were $1,025,000.

Final Tax Removal Unlikely Next Year

WASHINGTON, June 3—Hope of the automobile industry that the remaining 3 per cent excise tax would be completely repealed next year was given a set back here this week by the announcement from the White House that President Coolidge does not see any opportunity for further tax reduction next year, or in fact, for the next several years.

Repeal of all of the war time excise taxes, with the exception of 3 per cent on passenger cars, was put into effect on March 29 of this year. It was announced at that time that the interests allied with the automobile industry would not be content with less than complete repeal of the remaining 3 per cent tax. Under an agreement, however, it was tentatively arranged that if Congress granted the partial repeal, that the industry would acquiesce in the remaining 3 per cent for one year. This, however, was not agreed to by the American Automobile Association, representing several million motorists.

The fiscal troubles of the government, it was said at the White House, are not so much concerned with this year as they will be next year and the following year, when the real effect of the present tax reduction will be felt.

Chrysler "80" Reduced

DETROIT, May 29—Reductions in the price of the Chrysler Imperial "80," ranging from $100 to $400, were announced today, by the Chrysler Corp. The reductions follow:

Model	New Price	Old Price	Reduction
Phaeton	$2,495	$2,645	$150
Roadster	2,595	2,885	290
Coupe	2,895	3,195	300
Sedan (5-pass)....	3,095	3,395	300
Sedan (7-pass.)....	3,195	3,595	400
Sedan-limousine ..	3,595	3,695	100

Developments of the Week in Leading Motor Stocks

NEW YORK, June 3—The outstanding feature of the movements in motor stocks during the past week was the failure of these issues to respond wholeheartedly to rising prices on the rest of the Stock Exchange. After several days of generally advancing prices as the balance of the market rallied from its low point in the process of correcting its internal technical condition, the motor shares closed the week only slightly above the levels of the preceding week. With bearishness on the motors a fashion in the financial district, little speculative enthusiasm is apparent with any attempt to rally prices of the motor stocks. For the time being at least, the rule among professional traders is to leave this group of stocks alone, particularly on the constructive side, as there seems to be plenty of stock for sale at prices slightly above current levels.

The exception to this rule, however, proved to be Mack Trucks in which a successful sortie against the shorts was carried out early in the week. The stock advanced approximately 10 points above its low on the reaction, but later again lost a considerable part of the gain. There were no developments affecting the company's business to account for this advance, outside of reports of record business in April and May. General Motors and Pierce-Arrow also were strong.

All these issues, however, have a community of interest in the prosperous truck and bus manufacturing business on which Wall Street does not take the same pessimistic view of the outlook as on the strictly passenger car manufacturing companies. Strength in the New York tractions has served to draw attention to prospects of large motor bus business. The traction issues have been one of the outstanding features of the stock market in recent sessions due to developments in connection with the bus franchises for the City of New York. Many traders reason that if tractions are a buy on prospects of profitable bus operation, the motor bus manufacturing companies should likewise be benefitted.

Rubber shares continued under pressure with both U. S. Rubber and Goodrich showing losses for the week. Goodyear preferred stocks were firm at higher prices due to their comparatively high yield as investment issues with the 8 per cent prior preferred at 107 and the 7 per cent preferred at 101.

The accessory shares were generally firm during the week.—E. S.

Export Committees Outline Activities

Reduction in Rate to United Kingdom Sought—Would Reduce Handling Loss

NEW YORK, May 29—The committee authorized at the recent conference of member companies' traffic managers at the National Automobile Chamber of Commerce to consider ways and means of improved organization in the handling and stowage of automotive export shipments are as follows:

Ocean freight rate committee: F. R. Lackey, Studebaker, chairman; T. Y. Newman, Dodge, E. M. Grahn, General Motors, W. J. McGough, Lincoln, and Charles Fink, International Harvester.

Export loading rules committee: Capt. H. R. C. Johnston, General Motors, chairman; J. M. Pitkethly, Sterling, and F. X. Veit, White.

Inequalities in present steamship rates and service and proposed changes in ocean freight tariffs will be considered by the former committee. In cooperation with underwriters, surveyors and other interested groups, the second committee will draw up handling and storage rules designed to eliminate causes of damage.

Mr. Lackey's committee will pay special attention to the present 25 cents per cubic foot rate to United Kingdom ports. The steamship companies base jurisdiction for this rate upon increased charges for stevedoring, towboats and other items incident to steamship operation. The committee in reviewing this subject with the shipping conference will make use of these points:

Points to be Emphasized

Non-interference lines would accept cargo at a lower rate and it is inferred that conference lines can do likewise or else lose business in competition.

Comparative rates to nearby continental ports are considerably lower.

Motor vehicles are accepted for India, with trans-shipment at Liverpool, at 20 cents per cubic foot.

Increased duty on commercial cars in Great Britain presents greater sales resistance and it is felt that high ocean freight rates will still further impede motor vehicle sales, thereby decreasing volume of this business for steamship lines.

Cursory investigation indicates that cooperative chartering of steamships by motor vehicle exporters would result in lower shipping costs and might be resorted to if the conference will not accord equitable rates.

Difficulties also exist in Far East and River Plate conference rates. In the former case an extra charge of $2 is made for "heavy lift cargo" of more than two tons unit weight, whereas this limit has been raised to three tons in all other major conferences. All charter parties contain provisions that ship's tackle will handle cargo up to three tons unit weight, additional equipment being required for cargo weighing more.

Regarding the proposed increase from $8 to $10 per ton in automobile rates to River Plate ports on July 1, it was felt that this increase was being made by the conference due to the absence of any concerted objection by automotive exporters.

Discussion of these two rate situations with Far East and River Plate conferences by the rate committee, which will also handle the United Kingdom situation, is regarded as likely to lead to a more favorable position of automotive products in rate schedules.

Use of "dollies" of insufficient size for handling boxes on docks, improper adjustment of clamps when hoisting vehicles from railway cars to lighters and faulty dunnaging of boxes on lighters and in vessels' holds are pointed out as important factors contributing to damages suffered by motor vehicle export shipments in transit. All improper handling and stowage practices cause undue strain to boxed vehicles, resulting in concealed damages which, even though covered by marine insurance, creates dissatisfaction among dealers abroad and their customers.

Provision in consular invoices for indicating serial numbers of inner tubes in tires on motor cars shipped to Spain is found to cause considerable hardship and annoyance to exporters. This matter is to be discussed informally with Spain's Commercial Attaches at Washington.

It is generally agreed that there is no possibility of a change in Australian customs regulations providing for separate listing of all parts and equipment of motor vehicles shipped in addition to bare chassis.

BICYCLE SATURATION PROBLEM IN FRANCE

WASHINGTON, June 3—Bicycles are ten times more prevalent in France than automobiles with this country possessing a total of 6,400,000 or one for every six persons, the Automotive Division of the Department of Commerce is advised through consular dispatches. In discussing the problematical point of saturation, however, it is said, leading French bicycle manufacturers declare that it will not become an actuality for many years.

Alaska Shipments Increase

WASHINGTON, June 3—An increase in the popularity of the automobile in Alaska is indicated in a report from the manager of the Alaska Railroad just received by the Department of Interior showing that 67 cars have been received for shipment at Seward so far this spring. Shipments of motor vehicles included 47 automobiles, 5 trucks and 15 truck chassis. During a single week eight cars of automobiles arrived by steamship at Seward and were shipped over the railroad to various points in the interior of Alaska.

Fear Precedent in Bridge-Tunnel Act

Bus Operators Voice Opposition to Power Conferred on State Authorities

WASHINGTON, May 29—Opposition to the regulation of interstate passenger bus traffic through the Holland tunnel between New York and New Jersey, and over the Philadelphia-Camden bridge, across the Delaware River, provided under the terms of a bill introduced in the Senate by Reed, has been expressed by representatives of the motor transport industry, the American Automobile Association, the New York Motor Coach Owners Association and the Northeastern Interstate Bus Owners Association.

Hearings on the measure were held before the House Interstate and Foreign Commerce Committee. It applies only to motor buses and makes no mention of trucks. Replying to question as to why control of trucks was not provided in the bill, Senator Edwards, of New Jersey, who is strongly for the measure, said that that class of operation represented night traffic largely and did not interfere in the same manner as buses. He declared that because of the traffic in prospect in the next year, it was absolutely essential that some regulation be established.

Rep. Huddleston declared the bill was a dangerous precedent. "What you are trying to do is give these States a clear grant of Congressional power. Similar situations exist throughout the whole country, at probably a 100 congested points, where traffic at interstate lines might be involved. The fact that it is transportation over a bridge doesn't matter. It would be the same principle if it were only an ordinary highway."

J. E. Dunningham, representing the Northeastern Interstate Bus Owners Association, opposed the bill as dangerous and discriminating in a local situation in favor of trucks. H. S. Schertz, representing the New York Motor Coach Owners Association, and the Burgoyne operators, who operate 57 lines, running 333 buses, opposed the measure, and said it had been sold to the Senate on the ground that it was a local proposition and necessary to prevent congestion at the bridge and tunnel. He explained that the policy laid down by the Pennsylvania Utilities Commission had been to grant only one permit of convenience and necessity, to one operator on each route.

Representatives of the National Automobile Chamber of Commerce, who "sat in on the hearings as observers" included H. H. Rice, W. H. Brearly, and D. C. Fenner.

Manley Buys Washer Right

BUFFALO, June 1—The "Friend" Mfg. Co. of Gasport, N. Y., has sold the manufacturing rights of its Sprawy Auto Washer to the Manley Mfg. Co., of York, Pa.

Men of the Industry and What They Are Doing

Holmes Sales Director of Commerce Motor Truck

Commerce Motor Truck Co., which recently announced its new relay axle drive truck, has made several important changes in personnel in anticipation of a greatly increased business, W. R. Bassick, president and general manager, announced today.

Milton A. Holmes has been named director of sales and David Domizi has been appointed works manager.

Mr. Holmes has been identified with the truck industry for 14 years and was sales manager for the Republic Truck Co. from 1914 to 1918.

When Holmes went with the Republic company there were only two dealers and the monthly production averaged eight trucks. In his first year 1004 trucks were sold, and he built the sales organization up until it included 1300 dealers and the annual output was increased to 21,000 trucks.

Mr. Domizi had much to do with building the business of the Standard Equipment Co., of Cleveland, which was later sold to the Timken Axle Co. For the last year Mr. Domizi has been a consulting engineer for Timken.

DeHeus With Koch Company

Garrit C. DeHeus has resigned as sales manager of the Sterling Motor Truck Co., Milwaukee, to become a member of the board of directors of The Koch Company, Milwaukee, one of the oldest and largest advertising agencies in the Middle West. He has been elected vice-president and will have supervision of the automotive as well as some other major accounts handled by the Koch organization. Mr. DeHeus has been engaged in advertising and merchandising for many years.

R. F. Shaw Now in Chicago

R. F. Shaw, sales representative of the Kearney & Trecker Corp., who has been making his headquarters in Grand Rapids, Mich., has been transferred to the Chicago office. Mr. Shaw will continue to have charge of the western Michigan territory and will also cover part of the city of Chicago and northern Illinois.

Jordan Ad Club Speaker

E. S. Jordan, president, Jordan Motor Car Co., will address one of the general sessions of the Associated Advertising Clubs of the World Convention which will be held in Philadelphia June 20 to 24.

Body Company Builds

MIFFLINBURG, PA., June 1—Mifflinburg Body Co., manufacturers of commercial car bodies, has started work on a new factory building and will also make additions to its machine shop.

THIRD EXECUTIVE LEAVES DEPARTMENT

Eugene S. Gregg, for five years chief of the Transportation Division of the Department of Commerce, Washington, resigned this week to accept a position in the executive offices of the Western Electric Co., in New York City. He will assume his new duties at once. Mr. Gregg's resignation is the third in the past few weeks which the department has received from commodity or technical chiefs who have left the Government service.

Vanadium Officers Change

L. K. Diffenderfer has resigned as secretary and treasurer of the Vanadium Corp. of America to engage in private accounting and tax work. He is succeeded by E. R. Alpaugh, and P. J. Gibbons has been elected assistant treasurer. J. A. Miller, Jr., general sales engineer, will become assistant general sales manager with headquarters at New York. H. T. Chandler, assistant to the president, now at Detroit, will be transferred to New York in the same capacity. C. N. Dawe, formerly with the Studebaker Corp. at Detroit, becomes manager of the automotive division of the Vanadium corporation with headquarters at Detroit. T. N. Bourke, now district sales manager, becomes assistant manager of the automotive division.

Timken Promotes Curtis

G. W. Curtis has been promoted by Timken Roller Bearing Co. from industrial equipment engineer to district manager of sales, industrial division for the Milwaukee territory. Mr. Curtis will work with R. W. Ballentine who previously has handled this territory. S. M. Weckstein succeeds Mr. Curtis as industrial equipment engineer. G. W. Richards and A. R. Spicacci are appointed assistant industrial equipment engineers to assist Mr. Weckstein. H. E. Gilmore has been appointed manager of the St. Louis branch.

Soper Division Manager

Frank P. Soper has been promoted to sales manager of the distributor division of the Federal Motor Truck Co. Mr. Soper is one of the oldest members of the Federal sales organization having been with the company for 12 years and having served as assistant sales manager since 1917.

M. B. Smith With G.M.C.

M. B. Smith, formerly head of purchasing for the Detroit Edison Co. has joined the power and maintenance department of the General Motors Corp.

New Deere Tractor Company Names Officers and Board

The John Deere Tractor Co., a subsidiary of Deere & Co., and which but recently changed its name from the Waterloo Gasoline Engine Co., has completed formalities of the change by election of officers as follows:

William Butterworth, president; A. H. Head, vice-president and general manager; C. D. Wiman, vice-president; L. W. Witry, plant vice-president; C. A. Lasser, treasurer and assistant secretary, and T. F. Wharton, secretary and assistant treasurer. The above officers and Frank Silloway, C. C. Webber and B. F. Peek are directors.

The board reported continuous operation with gradually increasing force during the last 18 months with satisfactory trade conditions pointing to a continuation of demand through the summer and balance of the year.

Harris Heads Steel Sales

Richard R. Harris has been appointed general manager of sales of the Pittsburgh Steel Co. and subsidiary companies which include Pittsburgh Steel Products Co. and the National Steel Fabric Co. Mr. Harris has been general manager of sales for Pittsburgh Steel Products Co. for about twenty years. G. W. Jones, who has been assistant general manager of sales for Pittsburgh Steel Co., now becomes manager of sales succeeding John F. Hazen, resigned. C. F. Palmer, who has been manager of the Chicago office of Pittsburgh Steel Products, becomes manager of sales for this company. E. L. Benedict continues as vice-president and manager of sales of the National Steel Fabric Co.

Townend Joins Cadillac

Brian Townend, for the past nine years of the advertising staff of Iliffe & Sons, Ltd., printers and publishers, of London and Coventry, England, has come to the United States to join the advertising staff of the Cadillac Motor Car Co., Detroit. Iliffe & Sons are publishers of English technical magazines including "The Autocar," "The Automobile Engineer" and "The Motor Cycle."

Haugh Heads Radio Group

Arthur T. Haugh, vice-president of the King Products Mfg. Corp., makers of automobile parts and radio sets, has been elected president of the Radio Manufacturers Association. The election recently took place at the annual convention in Atlantic City.

Miniger on Mortgage Board

C. O. Miniger, president of Electric Auto-Lite Co., has been named a director of the Toledo Mortgage Co.

Tire Factories Make Sharp Production Cut

Cold Weather and Buyer's Strike Cause Large Accumulation of Stock

AKRON, June 3—Failure of business during May to come up to expectations, coupled with the fact that large inventories of automobile casings and tubes have piled up within the past few months has caused the majority of rubber manufacturers to make drastic cuts in tire production schedules.

Although this is usually the busiest period of the year for the industry, the first week in June saw curtailments being made all along the line. Akron factories, as well as those in other sections of the country, according to advices received here, reduced tire output at the beginning of the current month about 20 per cent below that of the preceding month, and less than 40 per cent, it is estimated, under peak levels. The industry as a whole is operating at the lowest point reached in several years.

Factories on Three-Day Week

Akron factories are operating from three to five days a week, and some departments are practically shut down. Several thousand rubber workers have been laid off within the past few weeks because of decreased tire output.

For some time now it has been evident that there has been a big over production of tires in this country. Many factories ran close to capacity in the first three or four months of the year, in expectation of a record breaking demand for tires this spring and summer, which so far has failed to materialize.

Retail sales, instead, have been retarded by the coldest spring weather in years, and by what has virtually amounted to a buyers' strike on the part of consumers, who have been eagerly awaiting lower tire prices.

As a result it is estimated that between 6,000,000 and 7,000,000 less tires have been sold so far this year than in 1925, despite the fact that motor car registration is the largest in history, and that gasoline consumption has increased about 20 per cent over last year.

Dealers have taken their cue from the attitude of the public, and have been buying strictly on a hand-to-month basis for months. They are determined to take no chances on being "stuck" with large stocks of tires, and have most of their profits wiped out by an unexpected price cut.

Inventories Reach 20,000,000

One Akron authority in close touch with the situation estimates that there are at present 20,000,000 tires in the hands of manufacturers and dealers. On the basis of 1925 consumption, there are now sufficient tires on hand for more than three months' supply. Because there are more tire sizes in existence, necessitating the carrying of larger stocks, dealers' inventories of around 6,000,000 tires are about normal. More than 13,000,000 tires are reported to be stored in factory and branch warehouses.

Manufacturers are still using high cost rubber and it hardly seems probably there will be any tire price cut this month. What will happen after July 1 depends largely on the future course of the crude rubber market.

Gordon Lee Heads Company to Build Planes at Akron

AKRON, May 29—Preparations are under way for the manufacture of airplanes at the Stow Aviation Field, near Akron, by an organization to be known as the Safety Airways Limited Co., headed by Gordon Lee, of the Fageol Motors Co. Planes are to be made and sold on the field. The company will feature the "Lee Skipper," termed an ideal airship. It is planned to have the first ship on the market by June 15. A superphone motor, manufactured with a three-plane shift for a cruising speed of 100 miles an hour, is to be used.

Ray Feexle, former army instructor, is vice-president of the concern, and H. C. Robins, Kent aviator, superintendent. The corps of engineers includes L. H. Smith, formerly of the Bryan Engineering and Advance Engineering Corporations, and John Watters, army instructor during the war. Stow field has been in operation for the past seven years, under ownership of Fred H. Smith.

Body Builders to Study Requirements of Owners

NEW YORK, June 2—There will be 34 exhibits at the show to be held in Hotel Statler, Detroit, June 8-10, in connection with the annual convention of the Automobile Body Builders Association. The exhibits will include materials, parts and special tool equipment of interest to body builders.

At the sales session on Tuesday, W. R. Laidlaw, president of the association, will extend a welcome, and Harold L. Blanchard, technical editor of Motor, will discuss "What Does the Buying Public Want Today in Body Design?"

To Discuss Bus Body Sizes

At the bus session Ray E. Plimpton, associate editor of Bus Transportation, will discuss "The Kind of a Bus Body that the Operator Wants," and Merrill C. Horine, sales promotion engineer of International Motor Co., will discuss "The Bus Body and the Laws of 48 States Affecting Its Size."

The body finish session features a paper by Harry C. Mougey, chief chemist, General Motors Corp. research laboratories, on "What Painting Method is Most Desirable from an Automobile Production Standpoint?" The body material session will include a paper by R. C. Todd, assistant general manager of sales, American Rolling Mill Co., on "Making Sheet Metal to Suit the Finisher," illustrated by motion pictures.

Financial Notes

Motor Wheel Corp. has declared regular quarterly dividend of 50 cents, payable June 20 to stock of record June 10.

Moto-Meter Co., Inc. has declared regular dividend of 90 cents on class A common, payable July 1 to stock of record June 15.

Packard Motor Car Co. has declared regular quarterly dividend of 50 cents, payable July 31 to stockholders of record July 15.

Murray Body Corp.—Judge Charles C. Simons in the United States District Court of Detroit has authorized payment of semi-annual interest due June first on Murray Body 6½ per cent ten-year sinking fund bonds.

Studebaker Corp. of America, on May 10, had 17,657 common stockholders and 980 preferred stockholders, compared with 11,726 common stockholders in 1924 shortly following the stock split-up on the basis of 2½ shares for one. In 1911 there were 420 common stockholders and 1,120 preferred stockholders.

Motor Finance Corp. of Newark, N. J.—A group composed of George H. Burr Co., New York; Caldwell & Co., Nashville, Tenn.; and Roger Caldwell & Co., Inc., New York, is offering $1,000,000 6 per cent collateral trust serial notes of this company, maturing in from one to six years and to yield from 5½ to 6½ per cent. Notes carry stock purchase warrants entitling the holder to purchase one share of common, no par value, at $10 a share. The common is on a $1 annual dividend basis. The principal business of the company consists of financing partial payments on medium priced automobiles.

"Selling Service," Theme of N.A.C.C. Service Forum

NEW YORK, June 3—"Selling Service," has been selected as the over-all theme of the Factory Service Managers Forum which will be held at the Book-Cadillac Hotel, Detroit, June 15 and 16, under National Automobile Chamber of Commerce direction. This means not only selling the repair job but more strictly, selling the maintenance idea to all concerned as a vital part in motor transportation. Many service managers of factory branches and distributors will attend in addition to the factory men.

Instead of the formal type of convention with set papers, this is to be a forum wherein each speaker will open a topic for discussion in which any or all may participate. The program has been made up principally of "request numbers" selected by delegates. Alvan Macauley, chairman of the service committee of the N. A. C. C. will preside at the opening session.

Included in the list of speakers are W. C. Boynton, C. H. Croninger, A. R. Sandt, J. H. Pile, L. T. Hanford, G. W. Brogan, M. C. Horine, H. N. Davock, F. A. Bonham, A. B. Cumner, E. L. Richards and L. A. Danse.

Fuel Short Measure Laid to Tank Gages

Weights and Measures Conference Declares Owners Should Require Accuracy

WASHINGTON, May 29—Use of glass containers for the sale of lubricating oil at all filling stations; a change in the method of connecting taximeters, changing from the wheel drive method, to transmission drive, and the necessity of motorists insisting on more accuracy in their tank gages and gasoline purchases, were urged before the Nineteenth National Conference of Weights and Measures, closing a four-day conference here this week.

The adoption of regulations forcing gasoline filling stations to use only glass containers for selling lubricating oil, was urged by Howard R. Estes, city sealer of Weights and Measures of Flint. The present metal containers, if bent, he pointed out, means short weight. If the quart size is used, he declared, "it requires a trained juggler to fill and carry full, while if a larger capacity container is used, say two quart container, to deliver a quart of oil, the motorist has no means of being assured full measure."

Theodore A. Seraphin, district supervisor, Bureau of Weights and Measures, Philadelphia, declared that his department on check-up complaints of shortage in gasoline purchases by motorists, "prove that nearly half of them are caused by motorists having too much confidence in the accuracy of their tank gage." Other causes for gasoline short weights were assigned as (1) Operator deliberately short measures the motorist; (2) pump being operated on an empty tank; (3) leaky foot valve; (4) pump out of adjustment and other conditions which necessitate repairs to pump.

Tests Show Short Weight

The need for more stringent supervision of gasoline filling stations was cited by M. A. Bridge, sealer of Weights and Measures of Columbus. As evidence of the necessity, he recited a recent test made by his department in Columbus. It showed that out of 24 stations visited, making 24 different gasoline purchases, that 19 were short measured, one was correct and four slightly over measure.

Figuring the cost, he declared, that on a basis of the average short weight, multiplied by the 50,000 passenger cars and 4000 trucks in Columbus, that it meant a loss to the motorist of 2390 gallons a day at 23 cents per gallon, a loss of over $200,000 a year. He pointed out that the high gasoline consumption, in many instances was charged up to the automobile manufacturer and engine maker, "whereas the figures show that much of it is dishonesty in gasoline sales."

George F. Austin, sealer of Weights and Measures in Detroit, urged that manufacturers be required to build taxis with transmission drive, as that system of meter registration he declared superior to wheel drive. Cab owners in Detroit, he told the conference, had reported that transmission drive for taximeters would save them thousands of dollars annually in upkeep, eliminate cable trouble and the laying up of their cabs during the process of repairs, and at the same time be more equitable for the public.

More than a score of other speakers spoke on the best methods of gasoline short weight checking methods, the type automobile tanks most suitable, etc.

Favor Meter on Transmission

Manufacturers of taxicab meters, themselves, are anxious to protect the public against fraud and inaccuracy in meter mileage registration, the delegates were told by representative of three meter manufacturers. Representatives told the conferees that the manufacturers themselves believed that greater accuracy and less tampering can be affected by the use of the meter on transmission drive. Manufacturers represented included the United States Taximeter Co., Ohmer Fare Register Co., and the Pittsburgh Taximeter Co.

A. Keene, of the U. S. Taximeter Co. stated that taxicab tolls paid in New York City last year amounted to $150,000,000. The present front wheel drive for meters, he declared, can be tampered with to affect the toll as much as 10 per cent, even after inspection by officials. He explained how this might be increased to 30 per cent and even as high as 75 per cent. Tampering, with the transmission drive, he declared, is much more difficult and expensive.

George F. Austin, sealer of weights and measures of Detroit and well acquainted in the automotive industry, was elected secretary of the National Weights and Measures Conference at its closing session here. Other officers elected were G. J. Burgess, of the U. S. Bureau of Standards, president; George Warner, Madison, Wis., and J. H. Foley, of New Jersey, vice-presidents; and Dr. S. W. Stratton, president of the Massachusetts Institute of Technology, honorary vice-president.

Adopt Standards on Rivets

NEW YORK, May 29—Tentative standards for small rivets (7/16 inch nominal diameter and under); tinners, coopers and belt rivets, have recently been completed by a sub-committee of the Sectional Committee on the Standardization of Bolt, Nut and Rivet Proportions. This tentative standard is now being voted on by the Sectional Committee.

The Sectional Committee consists of 49 men representing 20 national organizations. It was organized in March, 1922, by the Society of Automotive Engineers and The American Society of Mechanical Engineers acting as joint sponsors under the procedure of the American Engineering Standards Committee.

General Trade Below Automotive Activity

Reserve Board Summary Shows April Recessions With Further Price Reductions

WASHINGTON, June 3—Automobile production continued in large volume during April and early May although industrial and trade activity generally declined slightly in this period and was accompanied by a further reduction in the general level of prices, the Federal Reserve Board announces here in its summary of general business and financial conditions throughout the country.

The board reported there was a continued large demand for commercial credit and the volume of security loans remained at a constant level after a rapid decline since the first of the present year.

"Production in basic industries," according to the Federal Reserve Board's index, which does not include automobiles, "decreased 1 per cent in April. Slight increases in production of lumber and pig iron were more than offset by declines in output in other industries. Particularly large recessions were shown in the production of steel ingots and in textile mill activity.

"Factory employment and pay rolls declined slightly in April, particularly in the food, tobacco, textile and boot and shoe industries. The value of building contracts awarded during April was smaller than in March and practically the same as in April of last year. Awards for the first two weeks in May, however, showed increases as compared with the same weeks in 1925."

World Bestos Awarded Sixteen Process Patents

NEW YORK, June 1—The recent patent issue to the World Bestos Corp. is of importance in the asbestos and automobile fields. On May 18, 1926, 16 patents were granted to the company, containing 699 claims covering novel and revolutionary means and processes for manufacturing asbestos yarn and yarns and fabrics containing such yarn. Under the processes covered, the asbestos is pulped into a paper or felt and from this the yarn is manufactured. This produces a high quality product and eliminates the necessity of mixing cotton fibre with the asbestos.

The claims granted are the result of many years of research and development work by the company. Fourteen of the patents were applied for under the name of J. Allen Heany, New Haven, Conn., and the other two by William Nanfeldt.

The World Bestos Corp. is a Delaware corporation operating a yarn and brake lining plant at Paterson, N. J. The company has already made great headway and has been working at full capacity for the past six months.

South Africa Sales Exceed Estimates

Ownership Ratio Now 1 to 23—Time Sales Welcomed—Used Cars Increase

JOHANNESBURG, SOUTH AFRICA, May 8 (*by mail*)—Business during the first four months of 1926 has proved excellent throughout South Africa as far as the motor industry is concerned. Drought in some parts of the Transvaal and Orange Free State has led to a shortage of ready cash among the farmers affected, but in other parts of South Africa the season has been good. The South African Motor Traders Association has published its annual report for 1925-26, and it is stated that the year under review has been exceptionally steady.

It is pointed out that, taking cars and trucks alone, there is about one motor vehicle for every 23 of the population in South Africa. This brings up the interesting and oft-exploded subject of saturation. In California there is one motor vehicle for every three people, and even if it costs two or three times as much to buy and run an automobile in South Africa, the figure for South Africa should be about one in seven or eight. However, it is thought that the figure of 16,500 car sales reached in 1925 was inflated owing to the very prosperous state of the country as a whole. The figure of 15,000 has been taken as an estimate for car sales in 1926, although during the first four months of the year the proportion has been considerably higher. This figure represents 18 per cent less than 1925, but 11 per cent more than 1924. The membership of the Traders association now stands at 464, being an increase of twelve on the previous year.

Dealers Buildings Increasing

There has been a considerable amount of extension building in the motor centers of Johannesburg, Capetown, Durban and other cities recently. Several large buildings have been erected and others are being planned. In Capetown at least half a dozen buildings, designed expressly for the motor trade, have been completed. The roads question has now been taken from the back rank of politics and placed in the forefront of all issues that are before the country at the present time. Members of the association everywhere are supporting the good roads movement.

In regard to hire purchase finance, there are now four companies operating in South Africa. These companies finance hire purchase, or long term, transactions for the motor trade. The association points out that while these companies are heartily welcomed, they should be organized on sounder, and in some cases fairer, lines. The Council of the association maintains that such schemes should embrace these points: 1. No charge to the dealer. 2. Some form of recourse on a dealer to ensure sound trading. 3. A rate of interest that is fair to both parties concerned. It is stated that the flotation of another company including these points is under consideration.

Try Out Used Car Methods

The problem of the used car is becoming more acute as the number of cars running in South Africa increases. Motor traders are very much alive to this fact, and are trying to cope with the problem. It is a fact that in many cases motor traders have increased the price of new cars to a figure permitting of over-allowances on used cars. It is thought that such a policy is unsound. Endeavors are being made to educate the public to the real value of used cars. Great interest is taken in the many used car schemes being tried out in America, and many motor traders in South Africa are prepared to follow out any practical suggestions.

It is unfortunate that the tire trade in the Union is still in a most unsatisfactory condition, although some centers now have price maintenance schemes in operation. In Durban price maintenance is said to be working successfully. The dealers in clearance stocks of tires are said to be cutting prices considerably, and in Capetown and Johannesburg the tire position is somewhat chaotic. Accessory business has increased of late, and progress is promising. In any case this section of the motor trade is steady. It is generally admitted that this branch of business has not been fully developed.

Assembly Plants Make Changes

South Africa now has two motor assembling plants in operation. These are the Ford and General Motors plants at Port Elizabeth. Wide reaching changes of policy are being put into operation by both these concerns. The new moves have profoundly affected the whole industry, and up to the present have had rather an unsettling effect. On the other hand South Africa wants industries, and Port Elizabeth is pleased with its new position as the motor manufacturing center of South Africa.

VENETIAN GROCERS USING MOTORBOATS

MILWAUKEE, June 1—Sentiment and efficiency are waging an industrial battle in Venice, the city of canals and operatic gondoliers, according to William W. Kiss, sales manager of the Evinrude Motor Co.

Use of American marine motors, especially the outboard motor for canoes, rowboats, etc., is contested by the tourist expectation of being propelled around in gondolas by a gay gondolier with musical tendencies.

However, there being no particular romance in delivering the morning's groceries, Milwaukee-made outboard motors are coming into general use on the Venetian commercial delivery boats.

Crop Prices Reduce New Zealand Sales

N.A.C.C. Representative Finds Market Well Organized—Plans Traffic Regulation

NEW YORK, May 29—New Zealand automotive dealers and wholesalers are well organized, according to Walton Schmidt, who, as field representative of the National Automobile Chamber of Commerce, is making a trip through Australasia and the Far East. Recently he spent two weeks lecturing in New Zealand on his way to the International Motor Show which will be held at Melbourne, Australia.

He reports that New Zealand dealers are organized in 29 groups which are united in the New Zealand Motor Trade Association. These organizations have been developed largely through the efforts of J. F. Cousens, secretary of the N. Z. M. T. A. There are also 16 automobile owners' clubs united in two groups covering the north and south Islands.

New Zealand's registration is 87,000 passenger cars and 18,000 trucks. The need of traffic planning and safety work is increasingly evident and Mr. Schmidt's visit has helped toward the solution of these problems. The Hon. H. Newton, under secretary of the Department of Internal Affairs, New Zealand Government, is preparing new regulations for motor vehicles and has found many phases of American experience, as related by Mr. Schmidt, helpful in this work, especially the experience of the Hoover conference on Street and Highway Safety. New Zealand has about 1100 buses, of which 150 are operated by municipal tramways. There is no bus regulation and competition is keen. A recent conference under Government patronage is expected to result in bus operation.

Low wool and other low prices have curtailed automobile sales somewhat, but price increases will restore prosperity to the New Zealand industry. Some new dealers have been giving excessive time payment allowances. This has reacted against the whole industry, but a few of the larger concerns are setting a good example of sound credit methods.

Seek to Free Trade Flow

WASHINGTON, May 29—Information showing hindrances to development of foreign trade is now being assembled by an American sub-committee under a plan for removing artificial barriers to international trade which has been instituted by the International Chamber of Commerce. The American sub-committee includes John N. Willys, chairman of the foreign trade committee of the National Automobile Chamber of Commerce.

Action on recommendations submitted from all nations will be taken at the Stockholm meeting of the International Chamber in June, 1927.

Bus-Truck Benefit Seen in I.C.C. Study

NEW YORK, June 1—If it is sufficiently thorough to cover all the facts involved, the investigation by the Interstate Commerce Commission of motor bus and truck operation in connection or in competition with the railways is expected by leaders of the industry here to prove of large service to all concerned.

It is believed that if the commission learns all the facts, it will be in a much better position to give due regard to the interests of the bus and truck industry. Announcement that the commission planned such an investigation was well received also because it is presumed that Federal legislation to regulate bus and truck common carriers in interstate service will now await the report of the investigation, which will probably be presented to Congress next winter.

It is understood that the commission has before it two cases involving the use of trucks and buses by railways, but has no data for guidance in handling these cases. It is pointed out here that the commission has no jurisdiction over trucks or buses, except in terminal use.

The investigation will probably cover the whole subject of bus and truck operation, including phases upon which the commission would not be legally empowered to make a final decision.

Battery Meeting Date Set

NEW YORK, May 29—O. B. Towne, commissioner, announces that the annual meeting of the National Battery Manufacturers Association will be held June 25-26 at the Roosevelt Hotel, New York.

Coming Feature Issues of Chilton Class Journal Publications

June 10—Automotive Industries Annual Engineering Issue.

Sept. 30—Automotive Industries Annual Production Issue

Kauffman Metal Products Ordered Sold on June 19

TOLEDO, May 29—Sale of the plants and machinery of the Kauffman Metal Products Co., manufacturers of Logan-gears and other automotive equipment, will be held at public auction at the Lucas county courthouse in Toledo on June 19 at 10 a. m., it has been announced by the receivers.

The company has plants at Bellefontaine and Toledo. Upset price on the real estate and plants is $124,000 and on the personal effects, contracts, patents and some machinery is $1000.

George E. Hardy, Toledo, and E. Ray Albaugh, Bellefontaine, are the receivers.

Prize for Cuban Essay

NEW YORK, May 29—Under the auspices of the National Automobile Chamber of Commerce, in cooperation with a committee of leading citizens of Cuba, an essay contest for Cuban school children is to be conducted, with a trip to the United States as the prize. The subject of the essays will be, "What Highway Development Will Do for My Neighborhood." The Cuban committee is now being formed.

Bus Riders Increase on New Jersey Lines

JERSEY CITY, May 29—About 100 of of the original order for 333 gas-electric buses placed with the Yellow Truck & Coach Mfg. Corp. are now in operation by the Public Service Transportation Co., a subsidiary of the Public Service Corp. of New Jersey. A supplemental order for 54 has been placed. Most of these are expected to be in regular service about August. The Public Service fleet, between 800 and 900 buses, will then be the largest operated by a street railway.

This bus fleet has been operated at a net loss but recent statements show heavy reductions in the deficits. The net loss for the first quarter this year was $143,024 compared with $541,841 in the 1925 quarter. For the year ended March 31, net loss was $342,545 against $1,245,-283 for the previous yearly period.

The percentage of bus passengers to total trolley and bus passengers carried by bus is steadily increasing. It rose from 24 per cent in the first quarter last year to 29½ per cent in the first quarter this year. In the year ended Dec. 31, 1923, 1,952,059 bus passengers were carried. This increased to 69,383,643 in 1924 and to 146,053,237 in 1925. The percentage of bus passengers to total passengers increased from one-half of one per cent to 14 and 26 per cent.

Union Buys Blackledge

DETROIT, May 29—Union Steel Products Co. of Albion, Mich., has purchased the business and good will of the Blackledge Mfg. Co. of Chicago.

Calendar of Coming Events

SHOWS

Brussels ..... Dec.

Buenos Aires ..... Dec. 7-20
Ninth Argentine Automobile Show, Palermo Park.

Chicago ..... Nov. 8-13
Coliseum, Automotive Equipment Association.

Chicago ..... Jan. 29-Feb. 5
National, Coliseum, National Automobile Chamber of Commerce.

Geneva ..... June 10-20
Third Annual Automobile, Motor Cycle and Cycle Exposition.

Lima ..... July 28
First Peruvian Automobile Show, Under Auspices Peruvian Touring Club.

London ..... Oct. 4-9
Olympia Motor Cycle.

London ..... Oct. 21-30

Milan ..... Sept.
Fifth International Road Congress and Exposition.

New Haven ..... Sept. 7-10
Machine Tool Exhibition.

New York ..... Jan. 8-15
National, Grand Central Palace, National Automobile Chamber of Commerce.

Paris ..... Oct. 7-17
Auto Salon, Grand Palais.

Prague ..... Sept.

CONVENTIONS

American Electric Railway Association, Cleveland Public Auditorium, Cleveland ..... Oct. 4-8

Associated Manufacturers of Fabric Auto Equipment, Inc., La Salle Hotel, Chicago ..... Nov. 13

Automobile Body Builders Association, Hotel Statler, Detroit ..... June 8-10

Automotive Equipment Association, Mount Royal Hotel, Montreal, Canada ..... June 14-19

National Association of Automobile Show and Association Managers, Drake Hotel, Chicago ..... July 27-28

National Automobile Chamber of Commerce, Factory Service Managers, Book-Cadillac, Detroit ..... June 15-16

National Battery Manufacturers Association, Roosevelt Hotel, New York City ..... June 25-26

National Standard Parts Association, Hotel Sherman, Chicago .... Nov. 15-19

National Tire Dealers Association, Inc., Memphis, Tenn. ..... Nov. 16-18

Society of Industrial Engineers, Bellevue-Stratford Hotel, Philadelphia. June 16-18

United States Good Roads Association, Inc., and Bankhead National Highway Association, Santa Monica, Calif. ..... June 7-12

S. A. E. MEETINGS

National

Boston, Nov. 16-18, National Transportation and Service.

Chicago, Sept. 21-23, Production Engineering, Hotel Sherman.

Philadelphia ..... Sept. 2-3
Aeronautical.

RACES

Altoona ..... June 12
Flag Day Races. Speedway.

Altoona ..... Sept. 6
Labor Day Races. Speedway.

Atlantic City ..... July 17

Atlantic City ..... Sept. 25

Charlotte, N. C. ..... Aug. 23

Le Mans, France ..... June 12-13
Rudge-Whitworth 24-hour stock car race.

Los Angeles ..... Nov. 25

Marseilles ..... June 27
French Grand Prix, Miramas Track.

Salem, N. H. ..... July 5

Salem, N. H. ..... Oct. 12